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RAILWAY AGE

AUGUST 23, 1947

FOUNDED IN 1856

90 MILES AN HOUR ON A SHORT LINE

The 81-mile Atlanta and Saint Andrews Bay Railway (The Bay Line) one of the first short lines to employ Diesel motive power, is now giving passengers the clean, quiet travel and on-time performance of a main-line Diesel locomotive.

This progressive road, operating between Panama City, Florida, and Dothan, Alabama, has recently installed a General Motors F3 unit geared to pull passenger trains at 90 miles an hour.

Vitally important in this type of operation is the extremely high utilization possible with a General Motors Diesel locomotive. The fact that GM Diesels get more work done "round the clock" with less time out for servicing means lower costs of operation and maintenance. It often means, too, that fewer locomotives are needed to do the job. These Diesels not only haul longer trains, and do their own switching at stops, but are easily interchangeable for freight or passenger service.

In addition to operating economies, the *faster, more reliable* service of this modern power attracts passengers, builds revenue, and puts the railroad in favorable position to compete successfully with other forms of transportation.

GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION

GENERAL MOTORS LA GRANGE, ILL.

Fairbanks-Morse

FAIRBANKS-MORSE TO DELIVER FREIGHT LOCOMOTIVE TO NYC

4,000-hp. Unit Is Line's First Fairbanks-Morse Diesel Road Locomotive

Delivery of a sleek, 4,000-hp. Fairbanks-Morse diesel-electric road locomotive to the New York Central Railroad will be made in mid-September, according to a recent announcement by officials of Fairbanks, Morse & Co. It will be the first Fairbanks-Morse diesel road locomotive to enter service on New York Central rails.

The locomotive, representing the latest and newest in Fairbanks-Morse diesel-electric design, will be put to work hauling freight on the main lines of the New York Central. It comprises twin units of 2,000-hp. each, both with operating controls. Source of power for this is the same as is to be found in every Fairbanks-Morse diesel locomotive — the famed opposed-piston diesel engine. Substantially more than 3½ million "OP" diesel engine horsepower have seen active service. This engine departs radically from the conventional diesel engine design—the chief difference lying in its principle of operation. In one single revolution of the crankshaft, six complete operations take place: compression, injection, combustion, expansion, exhaust, and scavenging.

Basic advantages of the opposed-piston diesel engine are its extreme simplicity and accessibility. In fact, the engine is noted for its great reduction in complicated parts—an important contribution to operating and maintenance economy. Too, it is built to permit quick, easy inspection and servicing with a minimum of dismantling.

Interest in Fairbanks-Morse diesel road locomotives is mounting steadily, as evidenced not only by the number that are already in operation on major railroads today, but also by the many locomotives that are now on order for future delivery. Their dependability and consistently low cost of operation are well established facts. Sound construction, tested performance, and outstanding success show why more and more Fairbanks-Morse diesel locomotives are riding the rails of America.

Fairbanks-Morse: a name worth remembering.

FOR FURTHER INFORMATION ON FAIRBANKS-MORSE DIESEL LOCOMOTIVES, WRITE, WIRE, OR PHONE RAILROAD DIVISION, FAIRBANKS, MORSE & CO., FAIRBANKS-MORSE BLDG., CHICAGO 5, ILLINOIS

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B. & O. replaces important 60-year-old structure with one built to carry modern loads. Design and construction embody many noteworthy features.

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Four fundamentals of the economic value and utility of the motive-power types. Characteristics of steam, Diesel-electric and electric locomotives; also, prospective types.

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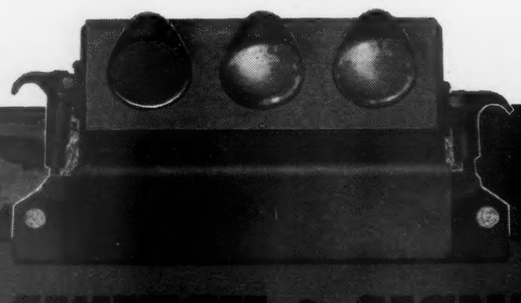


UNION SWITCH & SIGNAL COMPANY

SWISSVALE PENNSYLVANIA

NEW YORK CHICAGO ST. LOUIS SAN FRANCISCO

The Week at a Glance

CUSTOMERS WANT SERVICE: The results of the seventh annual survey of public opinion, made for the railroads by Opinion Research with its time-tested technique, include the significant information that 36 per cent of the general public —and 47 per cent of frequent train travelers—think the railroads could give better passenger service than they are giving. That the customers' willingness to make allowances for conditions directly attributable to war is wearing thin is shown by the increase since last year (when it was 41 per cent) in the number of regular travelers holding this view. And increasingly, according to the survey—the findings are summarized on page 41 this week—the public is placing the responsibility for better service on railroad management, rather than on the government, or the still abnormal times, or the railroads' employees.

●

COMPETITION APPRAISED: There has been a growing trend of public preference for air travel, these surveys have shown over the years, but this trend has been reversed this year, and the air lines appear to have lost slightly in public favor. Safety, spaciousness, freedom of movement, and dependability are the trains' chief advantages, the poll showed, while the planes' main attraction is speed. Nevertheless, a substantial majority of experienced travelers consider air line employees more courteous than railroad employees, and more courtesy is listed as the chief improvement in passenger service the public wants from the railroads. The survey showed also that there are many people who would find travel by train more to their liking if improved equipment was in service. But most people (71 per cent, specifically) consider the railroads the common carrier most essential to the national welfare, and only a few (12 per cent) have any illusions about the desirability of government ownership.

●

CASE FOR RATE INCREASE: The grounds on which the railroads base their appeal to the Interstate Commerce Commission for authority to increase freight rates sufficiently to add an estimated $1 billion to their annual revenues are summarized in memoranda made public this week, as reported in our news pages. The case boils down to the need for net income of a considerably higher order of magnitude than the 2½ per cent or less that present rates would produce in 1948 if current material costs and wage rates should not be increased.

●

A BILLION SPENT: In the first five months of this year the railroads spent—or obligated themselves to spend—over $1 billion for fuel, materials and supplies, and new equipment. This is big money, even in terms of the postwar inflated dollar, and the railroads are prepared to keep on spending at this rate—*provided* the revenues necessary to support such outlays are forthcoming. Whether the brotherhoods and the rate-fixing and tax-laying agencies of the government will permit them to continue to buy the products of industry in such volume is a question of concern not only to the railroads but to the industries that produce what the railroads buy (and to the employees of those industries, too, of course) and to the railroads' customers. The article on page 48 gives detailed figures on railroad purchases for May and for the year to date.

●

CARRYING THROUGH: One part of a railroad's departmental officers' job is planning new projects or the acquisition of new equipment. Another, and certainly an equally important, part of their job is convincing the holders of the company purse strings that the expenditure required to carry out those plans is going to be a productive expenditure. This phase of their responsibility is the subject of editorial comment this week, and the point is made that the best possible presentation of a case on paper often is much less effective than an actual demonstration of the operation or of the need for action.

●

DANGEROUS DISPARITY: The leaders of industry have other responsibilities than that of reducing the costs and increasing the profits of the business that employs them, important though that may be. It also is their responsibility to obtain, and to maintain, a *balanced* national economy, so that all industries—not only manufacturing industries but the farms and the retailers and the service trades and the transportation industry—can function successfully and contribute their proper share to the national welfare. Right now, our leading editorial shows, the economy is very much out of balance, because the wholesale price of all commodities, since 1926, has gone up 47 per cent although the price of railroad freight transportation —measured in revenue per ton-mile—is actually *lower* than it was in 1926. The effect shows up in the railroads' earnings, in their inability to proceed with the improvement and expansion of their facilities at the rate which the public welfare requires. Intelligent and foresighted leaders of industry will support the railroads' endeavors to obtain greater revenues from higher freight rates, and so contribute to the restoration of a balanced economy.

●

IN THE BACK OF THE BOOK: A merger of Lima Locomotive Works and the General Machinery Corporation is in the mill; one product of the new firm is expected to be a Diesel-electric locomotive. . . . Ton-miles in this year's first seven months were 14 per cent over the 1946 period. . . . More roads are asking for relief from requirements of the I. C. C. signaling order applying to high-speed lines. . . . The Federal Trade Commission has opened up on the steel industry's "monopoly" practices again, particularly the basing point system. . . . A. A. R. President Faricy has had quite a bit to say about the "Rip Van Winkle" ad published by the C. & O. anent the box car scarcity. . . . Some Diesel builders are raising prices.

MOTIVE POWER STUDY: The first part of a scholarly and authoritative evaluation of the various types of locomotives, by P. W. Kiefer of the New York Central, appears on page 43. Based largely on developments on that road, the discussion outlines the fundamentals of economic value and utility that must be determining in such a consideration of different designs, and then applies those fundamentals to the modern steam reciprocating locomotive, the straight electric, and the Diesel-electric. The comprehensive tests of reciprocating steam power to which the Central's recent acquisitions have been subjected are analyzed in illustrating the evolution of this locomotive type.

●

BIG B. & O. BRIDGE: The Baltimore & Ohio's modern bridge at Point Pleasant, W. Va., where its Ohio River line crosses the Kanawha river, is described in an illustrated article (page 35) by that road's engineer of bridges. The total length of the new structure is 2,482 ft., including a 480-ft. main-channel truss span, in contrast to the 3,945-ft. length of the old crossing, completed in 1888. As the article indicates, modern machinery and construction practices facilitated the replacement of this out-of-date structure.

●

"FREEDOM TRAIN": Some of the country's most precious historic documents, including the Declaration of Independence, are going on a long train trip, beginning next month. An article in the news section gives some information about the precautions being taken, in the conversion of the cars that will form the train and in the plans for its operation, to assure the safety of these exhibits on their 33,000-mile tour of the country.

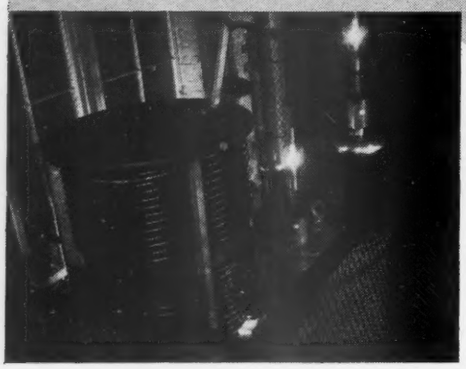
●

NON-STOPPER: Of the various advantages of centralized traffic control in the operation of single-track lines, undoubtedly the most impressive to the railroads' customers is the frequency with which dispatchers can arrange meets so effectively that neither train is required to stop. The railroad man appreciates that advantage, too, because he realizes what important economies ensue, both through the faster train movements that result and through the reduction of the expensive operation of stopping and starting heavy trains. A C. T. C. installation on which special study was given to a lay-out that would produce the maximum number of meets without stopping is that on the Burlington between Savanna, Ill., and Flag Center, described in one of our illustrated articles.

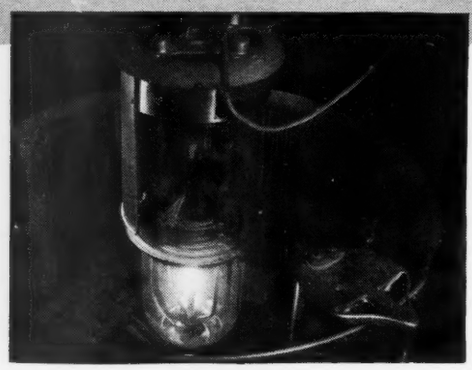
●

MOBILE PHONE SERVICE: Last week's "pre-view" of regular telephone service connecting moving trains to any subscriber reached by Bell System lines anywhere in the world is the subject of a short article herein. This service is now available to travelers on certain Pennsylvania and B. & O. trains between New York and Washington, and plans have been announced to extend it to other routes as the facilities are made available.

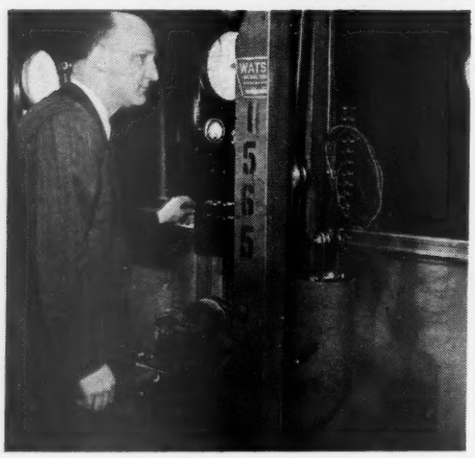
PRE-TESTING AND RE-TESTING
—behind every Okonite Cable



THESE D. C. TESTS FOR IMPERFECTIONS . . . At Okonite regular d. c. tests pick out imperfections in insulated wires and cables not detected by conventional methods. These d. c. tests, at 4 times the a. c. values, are in addition to the routine high voltage tests. "Something extra" is typical of Okonite production techniques and research procedures.

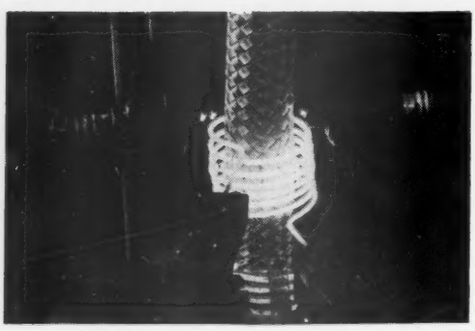


THIS "FOUL WEATHER" FRIEND TO CABLE USERS . . . Every kind of weather but fair is manufactured in Weatherometer used for testing sections of Okonite cable. Repeated cycles of water spray and ultra violet light are combined with freezing in a refrigerator. The result: violently contrasting effects which test cable drastically.

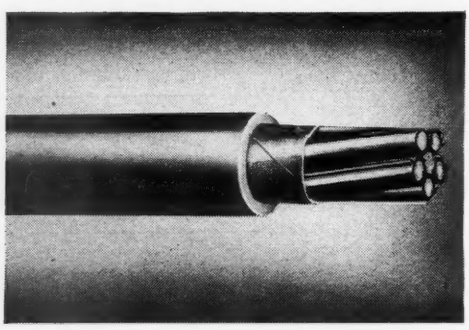


THIS OKONITE "TWIST" on CABLE TESTING . . . Okonite research includes subjecting short lengths of electrical cable to torsion tests, twisting through a spiral arc of 180° under load. Bending tests, impact tests, tests of wear-resistance by abrasion — these mechanical tests round out a program of electrical, chemical and weather exposure tests.

THIS BOMB THAT DESTROYS GUESSWORK . . . While accelerated aging tests cannot replace the study of actual exposure to weather in proving ground and in the field, they have a definite place in estimating the value of electrical insulation. The oxygen bomb used in these tests is one of many pieces of modern equipment used in Okonite research.



THIS GLOWING TRIBUTE TO CABLE FITNESS . . . Is a cable covering flameproof? Will it resist high temperatures when it comes to actual service? Flame tests in the Okonite laboratories help to answer questions like these long before a cable is manufactured. The measured current that makes the coil glow makes it possible to reproduce test after test without variation.



SUCH TESTS GIVE GUARANTEES of reliable performance in this Okonite-Okoprene signal cable. Other places where Okonite research benefits railroad men is in the manufacture of C. T. C. wires and cables, communication cables, jumpers and track wire, case and instrument wiring, car and shop wiring, battery cables, power circuits, portable cords. The Okonite Company, Passaic, N. J.

6007

OKONITE OKONITE SINCE 1878 **insulated wires and cables**

RAILWAY AGE

Commodity Prices and Freight Rates

If the average revenue received by the railways for carrying one ton of freight one mile had increased relatively as much between 1926 and April, 1947, as wholesale prices of all commodities, average revenue per ton-mile in April, 1947, would have been about 50 per cent higher than it was.

If revenue per ton-mile had increased relatively as much between August, 1939, and April, 1947, as wholesale prices, average revenue per ton-mile in April, 1947, would have been 70 per cent higher than it was.

The statistics proving these statements are derived from the reports of two government agencies, the Interstate Commerce Commission and the Bureau of Labor Statistics of the Department of Labor, and are given in an accompanying table. And prices have continued to increase since April, the latest month for which complete statistics are available.

Contrasting Trends

Average revenue per ton-mile is the only standard by which the level of freight rates as a whole can be measured. Average revenue per ton-mile was 11.21 mills in April, 1926; 9.62 mills in August, 1939; and 11.15 mills in April, 1947. Therefore, in April, 1947, it was one-half of one per cent *lower* than in 1926, while wholesale prices of all commodities were 47.7 per cent *higher*. Average revenue per ton-mile increased 11.6 per cent between August, 1939, and April, 1947, while wholesale prices increased 96.9 per cent.

The Bureau of Labor Statistics, for the purpose of calculating changes in wholesale prices, divides all commodities into ten major groups. The figures in the column of the table headed "April, 1947" are percentages of revenue per ton-mile and wholesale prices in 1926. The railways, in the operation, maintenance and improvement of their properties, are among the largest purchasers and users of fuels, metals and building materials. Therefore, statistics are given in the table showing not only changes since 1926 and 1939 in the prices of the ten major *groups* of commodities, but also changes in the prices of sub-groups of fuels, metals and building materials of which the railways are large users.

The prices of commodities are the best measure of "what the traffic will bear"—that is, of what freight rates shippers of the various commodities can afford to pay. With average revenue per ton-mile now slightly lower than in 1926, and wholesale prices of all the large groups of commodities ranging in April from 3.4 per cent to 79 per cent higher, and averaging almost 48 per cent higher, it is quite obvious that few or no shippers can reasonably contend that they cannot afford to pay higher freight rates.

The general advance of about 16 per cent in freight rates now being sought by the railways would make average revenue per ton per mile about 15½ per cent higher than in 1926. It would make average revenue per ton-mile about 34 per cent higher than in 1939; but this would not be a burdensome increase when applied to commodities the wholesale prices of which in April had increased an average of almost 97 per cent since August, 1939.

Railroads Are Buyers

Of as great importance as the effect of the increases in prices on "what the traffic will bear" is their effect on the costs of railway operation, maintenance and improvements. Among the increases in April since 1939 in the prices of commodities of which the railways are among the largest users were: Anthracite, 58 per cent; bituminous coal, 51 per cent; petroleum and its products, 67 per cent; iron and steel, 34 per cent; lumber, 204 per cent.

The railways have been subjected to large increases in taxes and wages, and are now confronted with demands for further large increases in their labor costs. But advances that have occurred and are still occurring in the prices they have to pay are among the principal

causes of the 50 per cent increase in their operating expenses that has occurred within the last five years. The railways are almost the only large industry in the country which is not now making record profits. In the first half of 1947 they handled about 50 per cent more traffic than in the first half of 1929, and made 35 per cent less net operating income. There is more need, in the national interest, for expansion of their capacity than of the capacity of any other industry; and they cannot improve and expand enough to meet the traffic demands of a period of record employment and production if they continue to be restricted by high taxes and expenses, and relatively low rates, to *depression* net earnings.

Increases in Freight Rates and Wholesale Prices of Commodities (1926=100)

	April, 1947	Per Cent Change Aug., 1939, to April, 1947
Average Revenue Per Ton-Mile	99.5	+ 11.6
Wholesale Prices, All Commodities	147.7	+ 96.9
Farm Products	177.0	+190.2
Foods	162.4	+141.7
Hides and Leather Products	166.4	+ 79.5
Textile Products	139.2	+105.3
Fuel and Lighting Materials	103.4	+ 42.4
Anthracite	113.9	+ 58.0
Bituminous Coal	145.0	+ 51.0
Petroleum and Products	86.3	+ 66.9
Metals and Metal Products	140.3	+ 50.5
Iron and Steel	127.6	+ 34.2
Plumbing and Heating	118.2	+ 49.1
Building Materials	178.8	+ 99.6
Brick and Tile	134.5	+ 48.6
Cement	114.0	+ 24.9
Lumber	273.5	+203.6
Paint and Paint Materials	175.5	+113.8
Plumbing and Heating	118.2	+ 49.1
Structural Steel	127.7	+ 19.0
Other Building Materials	143.7	+ 60.6
Chemicals and Allied Products	133.2	+ 79.5
Housefurnishing Goods	127.4	+ 48.8
Miscellaneous	115.7	+ 57.8

Those who have accepted positions of leadership in business have assumed the responsibilities of leadership. These responsibilities include the duty of doing all that is possible to keep the national economy in such balance that all industries will be able to function successfully. The national economy is now badly out of balance because the railways are not participating in the present prosperity. Leaders of industries that have got big increases in their prices will not show fairness, intelligence and foresight if they do not support whatever increases in rates may be necessary to enable the railways to carry out the large program of improvements and expansion of their properties which the demands of traffic, the interests of all industries and the public welfare make imperative.

THE CITIZEN'S RESPONSIBILITY.—Particularly in matters concerning the nation's welfare, the citizen, the community, the government are jointly responsible: the individual American, because he is the source of all energy in a democracy; the community, because it is the most immediate agent of action; and the government, because only through it can there be effective coordination of all the skills and knowledges, the resources and capacities that are demanded by an enterprise concerned with the welfare of 140 million human beings. But the root of success is still in the contribution of the individual. National welfare. . . . is the business of each citizen because it is he ultimately who suffers or profits.

—General Dwight D. Eisenhower in an address to the National Board of Fire Underwriters.

The Technique of "Selling" Top Management

Departmental officers know only too well that their task in initiating a new project or new type of equipment or material is only half accomplished when they themselves have decided what ought to be done. The other, and usually the harder, half of the job consists in "selling" their top management on the merits of the proposal, both in itself and in comparison with other proposed expenditures.

Departmental officers do not seem always to realize that presentation of the case for the improvements they know to be worth-while—in a manner easy for top management to understand—is a definite responsibility of theirs. Too often they become engrossed in the technicalities of their projects or operations, and leave to their managements the initiative in the major part of their planning.

When it happens that a department on a railroad does not receive what it considers to be its proper share of available funds for desirable improvements, it is easy enough to say that the top management is not alert or progressive—but, frequently, it would be nearer the truth to say instead that the department concerned has been insufficiently skillful and energetic in drawing attention to the merits of its wares.

Sometimes, though, even flawless presentations through the usual channels are insufficiently convincing. Some recent experiences indicate that, where feasible, a practical demonstration in the field provides an effective supplementary aid. In one instance, the management of a large road was completely won to the approval of a large and long-neglected program of passenger station redecoration and modernization by a detailed field inspection of these stations. In another, getting a few general officers to witness some improved track surfacing operations resulted in the approval of an expenditure of more than $200,000 for the purchase of additional machines of the type being used.

In still another case, while witnessing a demonstration of modern mechanized crib-cleaning operations, the president of the road was heard to say that, "from now on, there will be no more general track raising and surfacing on our main lines that is not accompanied by removal of the fouled ballast from the tie cribs." This statement represents a momentous decision in the interest of better-riding, more economically maintained track, which might not have been forthcoming for years if it had been promoted merely by routine office correspondence and in budget meetings.

There is nothing "high pressure" or selfish in the suggestion that, where a project has merit from the standpoint of the welfare of the company, every effort should be made to encourage top management to see for itself what can be done. To an increasing degree, those in top executive positions welcome the opportunity to study operations at first hand. And there will be still more of this, with marked benefit to railroading as a whole, if departmental officers will give more thought to their duty to "sell" their useful projects, not being content merely to originate them.

Popular Education in Economics

An organization, under sponsorship of leading educators and industrialists, has been established at Irvington-on-Hudson, N. Y., to promote widespread popular education in the fundamental principles of economics. The organization is known as the "Foundation for Economic Education" and its stated purpose is "to make the case for individual liberty and freedom of choice which are essential for economic life and progress."

"Mere sputtering on behalf of any idea is not convincing"—so the Foundation proposes to foster "greater depth of understanding" of the principles of freedom by those who already favor these principles; and, further, by "providing ideas, supported by facts, to the many thousands who can use them."

The Foundation has already issued a considerable list of pamphlet literature. It plans the publication of a selected "economics library" to include the best works in this field, and to promote the distribution of these books to public and private libraries. Local study groups will be encouraged, and special assistance will be proffered to writers, editors and others interested in promoting an understanding of economic and political liberty. Experiments will be conducted to determine the most effective techniques in popular education, including radio.

Current publications of the Foundation include a 90-page pamphlet, entitled "Planned Chaos," by the distinguished emigré Austrian economist, Ludwig von Mises; a 20 page pamphlet, "Liberty and Taxes," by Bradford B. Smith, economist for the United States Steel Corporation, and a periodical publication, "In Brief"—No. 2 of which is a short essay entitled "Show Me Another Country," which contrasts the favorable results of economic freedom in our country with the mingled poverty and servitude which characterize the nations which have been beguiled into a greater degree of statism and collectivism. The Foundation is selecting and distributing a "clipping of the week"—usually a report of some dangerous absurdity seriously proposed by Americans under the spell of collectivist political theories. This "clipping of the week" a few issues ago was a report of a proposal by the "Progressive Citizens Committee" (formerly the "Political Action Committee") favoring government ownership of railroads, coal and electric power.

Trustees of the Foundation include President Isaiah Bowman of Johns Hopkins University; President Henry Wriston of Brown University; President Charles White of the Republic Steel Corporation; Dr. Claude Robinson, president of the Opinion Research Corporation; President Hughston McBain of Marshall Field & Co.; and B. E. Hutchinson, chairman, finance committee, Chrysler Corporation. The president of the Fundation is Leonard E. Read.

Substantial corporate donors to the work of the Foundation include Armour & Co., Fruehauf Trailer Company, General Electric Company, General Motors, B. F. Goodrich Company, Inland Steel, Johns-Manville, New York Air Brake, U. S. Steel, and Westinghouse Electric.

Old Cars Cost More to Repair

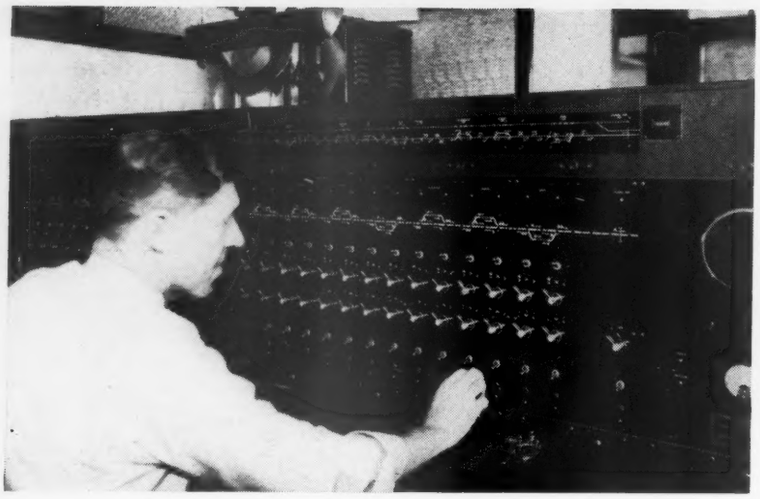
As with other railroad equipment, the repair of freight cars costs substantially more as they get older, and a point is eventually reached when it is no longer good economy to continue them in service. Increased labor and material costs which boost repair expense tend to shorten the time when it becomes economically desirable to retire old cars, but, on the other hand, higher first cost tends to lengthen this time. It is probable that these two factors at present just about offset each other.

Some highly pertinent new figures regarding freight-car age and maintenance cost as of January 1, 1947, were recently released by the American Railway Car Institute. The new age-group figures show that, of 1,746,721 freight-carrying cars owned by Class I railroads, 11.55 per cent are 1 to 5 years old; 13.75 per cent are 6 to 10 years old; 14.10 per cent are 16 to 20 years old; 24.96 per cent are 21 to 25 years old; 10.25 per cent are 26 to 30 years old; and 21.13 per cent are over 30 years old. These figures indicate some recent reduction in the percentage of cars in the 26-to-30 year age bracket, but in spite of this fact the number of cars 26 years old or more which normally would be retired, by prewar standards, was 547,968 at the end of 1946, or about one-third of the total.

The tabulation covering car condition and repair cost discloses that in the ten-year period from 1937 to 1946, inclusive, the monthly average number of freight cars in need of repairs reached a maximum of 222,905 in 1938, a minimum of 44,338 in 1943, and has subsequently increased steadily to 73,889 at the end of 1946. The three figures quoted represent 13.2, 2.7 and 4.3 per cent, respectively, of the freight cars on Class I roads, excluding work equipment. Meanwhile, total freight-car repair cost increased each year practically without a break from $133,884,261 in 1938 to $373,978,741 in 1946, these two figures representing average costs per car of $77.75 and $212.69, respectively.

During the past five years, it cost almost $1,000 to keep each freight car on Class I railroads in repair, regardless of whether the car was new or old. The total 5-year repair bill was over $1¾ billion, or enough to buy about 500,000 new freight cars. Following the first world war, railroads recognized that the solution of the problems of intensive freight-car use, deferred retirements and increased repair costs was the acquisition of new equipment; and new cars placed in service had increased to 175,748 in 1923.

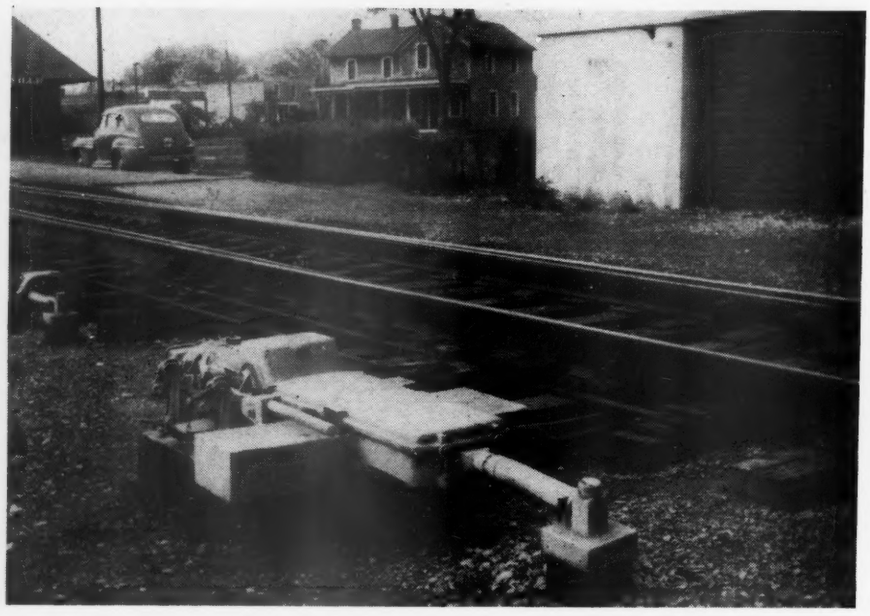
With utilization tremendously increased for a longer period during World War II, with retirements postponed and labor and material costs soaring, railroads have less reason than ever to defer the replacement of worn-out cars. Col. J. Monroe Johnson, director of the Office of Defense Transportation, having reached the conclusion that railroads need 100,000 new box cars and 200,000 freight cars of other types, has been insisting on a production rate of 10,000 new cars a month. Obviously, if new cars are installed at the rate of 10,000 cars a month and 7,000 cars a month are retired, it will take over eight years to make a net gain of 300,000 cars and realize the attendant improvement in performance and reduction in maintenance expense. The rapidity with which the railroads are able to retire obsolete cars, and thereby substantially reduce their freight car maintenance expenditures, will depend largely on the success with which the car builders meet the demand for increased production.



C. T. C. control machine in the dispatcher's office at Aurora

Project on 59 mi. of busy high-speed line includes seven long sidings spaced on time-distance basis averaging 5.85 mi., switch to switch, thus increasing the number of non-stop meets

Burlington Extends Single-Track C.T.C.



The power switch layouts are well constructed

By W. F. ZANE
Chief Signal Engineer
Chicago, Burlington & Quincy

IN accordance with a general policy of installing centralized traffic control on its heavy-traffic single-track lines, the Burlington has completed such a project on 59 mi. of single track between Flag Center, Ill., and Savanna. This project, with the 40 mi. of C.T.C. installed in 1943 between Aurora and Steward Junction, totals 99 mi., and completes all of the single-track mileage on the 427-mi. line between Chicago and St. Paul, Minn. The Burlington has three or more main tracks on the 37.7 mi. between Chicago and Aurora, and double track extends 282 mi. between Savanna and St. Paul.

The 8.5 mi. of double track between Steward Junction and Flag Center, which is used also by trains of the Chicago, Milwaukee, St. Paul & Pacific, was equipped in 1929 with centralized traffic control. One control machine in the dispatcher's office at Aurora now controls not only the 40 mi. of single-track C.T.C. between Aurora and Steward Junction, installed in 1942, but also the recently completed 59 mi. of single-track C.T.C. between Flag Center and Savanna. The operators in charge of the machine at Rochelle, which controls the 8.5 mi. of C.T.C. between Steward Junction and Flag Center, work under the supervision of the dispatcher at Aurora. Thus, the entire 107 mi. between Aurora and Savanna is now controlled with C.T.C. from one office.

Rolling Country

Between Flag Center and Savanna, the railroad traverses rolling country, with numerous short grades ranging up to about 0.8 per cent. Savanna is on the Mississippi river. Starting about three miles east of Savanna, a grade of about 0.8 per cent ascends eastward for about three miles. The curves are few, and most of them are 1 deg. or less, with some 2 deg. and only three of 3 deg. The track consists of 130-lb. rail and rock ballast. Therefore, in so far as grades, curves and track are concerned, this territory can handle heavy traffic at high speeds.

The traffic includes 12 passenger trains and an average of about 9 freight trains daily, with extra trains as required. Thus, a total of about 21 to 24 train movements are made daily

over this C.T.C. territory. These trains, except for the local freights, are in fast through service, either between Chicago and St. Paul or between Chicago and cities on the Pacific coast, by way of St. Paul. A further factor affecting the need for C.T.C. is that the preponderance of traffic is eastbound into Chicago during the early morning, and westbound out of Chicago during the late afternoon and evening. Previously, train movements were authorized by timetable and train orders, with automatic block protection. The installation of C.T.C., including power operation of siding switches and the use of signals to authorize train movements, has increased track capacity and facilitated train movements, especially of through freight trains.

Longer Sidings

Changes and additions were made in the lengths and locations of sidings. This was done to improve the uniformity of train time between sidings as well as to take advantage of grades and other local conditions when trains are entering and leaving sidings. The previous sidings at Polo and Hazelhurst were not located properly to be incorporated into the new C.T.C. operation. Therefore, a new 140-car siding, known as Carter, was constructed at a new location between Polo and Hazelhurst. The sidings at these two towns were left in place for use as house tracks, with hand-throw switch stands, and without C.T.C. signals for authorizing train movements.

Other sidings were lengthened to 140-car capacities, except two—one of these being 136-car capacity and the other 76-car capacity. The sidings are now spaced as uniformly as practicable on a time-distance basis for trains, the average distance between the west switch at one siding and the east switch of the next siding being 5.85 mi.

The freight trains operated over this territory are made up of about 80 cars, which, of course, is much less than the 140-car capacity of the sidings. One reason for the longer sidings is that trains can enter at the speeds for which the turnouts are designed, and, after the rear end is in the clear, there is plenty of track length left on which to stop.

Another advantage is that long sidings are advantageous in making meets in which neither train stops. These non-stop meets save a large amount of train time, and experience on this project, as well as other installations in service on the Burlington, shows that nearly 40 per cent of the meets can be made non-stop, where sidings are so arranged. As a part of the improvements at these seven sidings, the old turnouts were replaced with new No. 15 turnouts, with 30-ft. points, so that trains can enter or depart from the sidings at speeds up to 25 m.p.h.

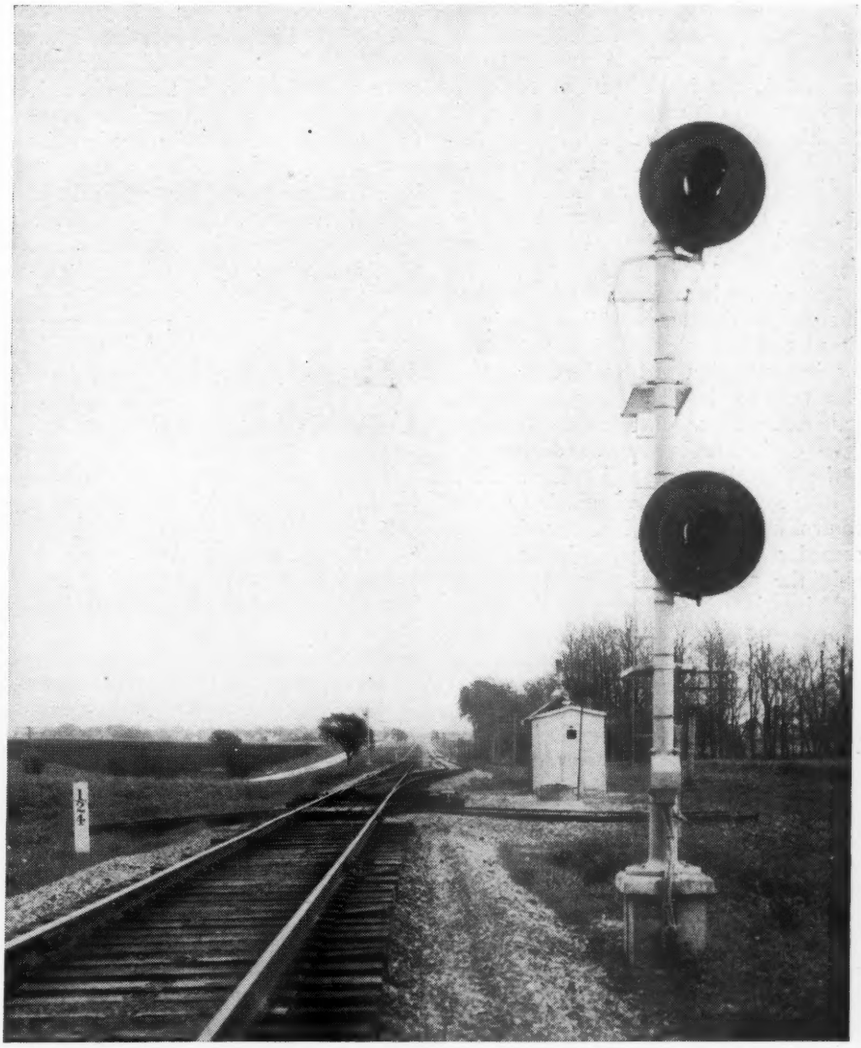
Previously this territory was protected by automatic block signaling including two-position, lower-quadrant semaphore signals. When installing the C.T.C., these old semaphores were removed, new searchlight signals being installed at the controlled siding switches, and color-light signals for intermediates.

Following Burlington standards, the top signal unit on all high signals governs main-line straightaway train movements. Such a signal displays red for Stop, and either yellow or green for a Proceed aspect, depending on occupancy of the two blocks ahead. The second unit is 5 ft. below the top one. This second unit, when used, governs diverging main-line routes other than to passing sidings. The third unit, on 7-ft. 9-in. centers below the second unit, is for directing trains to enter sidings. For example, such a third unit displays yellow under red in the top unit as the Restricting aspect to direct a train to enter a siding. A dwarf signal is used to display the Clear Restricting aspect to direct trains to leave a siding and enter the main track. It displays yellow if the first block is unoccupied, or green if two or more blocks are unoccupied.

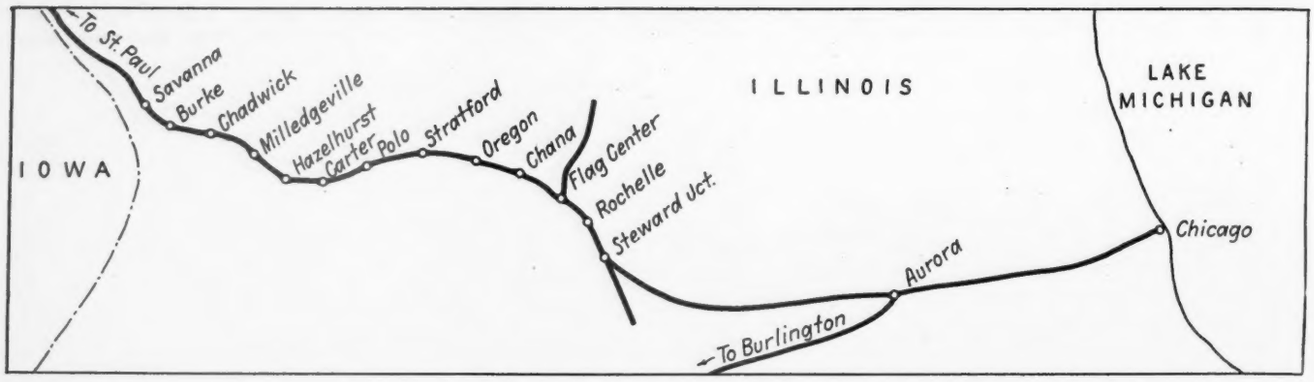
The C. T. C. Control Machine

The C.T.C. control machine in the dispatcher's office at Aurora has the Burlington's standard panel arrangement. The track and signal diagram includes lamps to repeat track occupancy of all sections of main track (1) between stations; (2) the OS sections at switches; and (3) the main track through stations, thus providing continuous indication, except for the sidings. In each of the symbols representing a siding, there is a hole in which a token can be placed by the dispatcher to remind him of the identification and location of a train using the siding.

Below the illuminated diagram is a row of small toggle switches, one under the symbol representing the OS section



New high-speed turnouts and long sidings are features of this project



Map showing general location of the new C. T. C. territory between Flag Center and Savanna

at each passing track switch. These switches are used by the dispatcher to cut in or cut out his annunciator bell as applying to the incoming OS indication from the corresponding field location. For example, if two opposing trains, quite widely separated, are approaching each other but it is too soon to establish a meeting point, the dispatcher can set the toggle switches to cause his annunciator bell to ring when the train or trains pass certain OS sections in approach to the siding which he plans to use for the meet. Thus, he can devote his attention to other work with confidence that the bell will call him in plenty of time to set up the signals for the meet as planned; or, if one of the trains does not make as good progress as expected, the meet can be arranged on close time at some other siding.

Experience has proved that this Burlington practice of providing the individual toggle control for the annunciator, in connection with each OS section, is a help to the dispatcher in that he can arrange for close meets between trains without having to devote his entire attention to the C.T.C. machine.

In the top of the desk portion of the control machine there is a graphic train recorder with pens which indicate not only the passing of trains at selected field locations but also record the clearing of signals. Corresponding to each passing-track switch location there are two pens. One is operated when a signal at the corresponding location is cleared, and the second when the OS section is occupied. Thus, the record on the chart shows how long the signal was cleared before the train arrived. The lack of a continuous "signal clear" record, with an OS track-occupancy recorded, shows that the train has passed a red signal. A very short "signal clear" record shows that the man in charge of the machine is not lining up the signal in time for the train to get a green instead of a yellow at the distant signal.

In the course of the installation, as the power switches and signaling at the ends of a siding were completed, they were placed in service as a remote-control interlocking under control of the dispatcher. With the timetable and train orders being continued for authorizing train movements, the dispatcher used the corresponding levers to control the switch and the signals at a given end of siding just as at any ordinary remotely-controlled interlocking.

This practice was continued until reaching a station at which operators were on duty 24 hr., so that train orders could be issued for the territory beyond to the west. Then the section from that point back to Flag Center was bulletined in service as centralized traffic control territory, the only difference being that the train movements were then authorized by the indications of the signals rather than by timetable and train orders. The C.T.C. between Flag Center and Savanna was thus bulletined in service in three sections. One advantage of this procedure is that the dispatchers and the enginemen had an opportunity to become acquainted with the new signaling gradually. Another advantage is that the signal forces can check and place in final service each of the siding switch layouts as a single unit, rather than being required to change over a great many such units at a predetermined time.

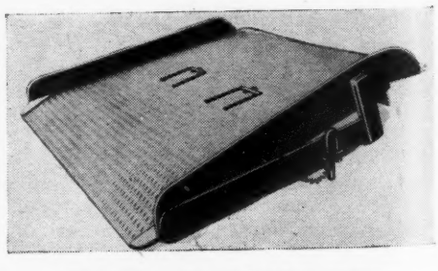
This C.T.C. was engineered and constructed by the signal department forces of the Burlington, the major items of equipment, such as power switch machines, additional signals, coding equipment and control machine, being furnished by the General Railway Signal Company.

"One-Man" Bridge Ramp

The Elizabeth Iron Works, Elizabeth, N. J., has announced the development of a "One-Man" bridge ramp, of 15,000 lb. capacity, for spanning the openings between platforms and freight cars or between cars spotted on adjacent tracks. This ramp is so designed that it can be handled and moved from one location to another by standard fork-lift trucks. The feature that makes such handling possible is a pair of lifting handles in the floor of the ramp, which are so spaced as to accommodate the forks of standard lift trucks. When not in use, the handles are protected by recesses in the ramp floor, providing a flush riding surface.

These ramps are available in a variety of sizes to span gaps of 5 in. to 58 in., with height differentials up to 7 in. They are fabricated from steel plates of a non-slip pattern, supported on two steel stringers one on each side, which are raised above the floor to prevent trucks from running off the ramp. A floating arm on each side of the ramp, designed to remain in a level position, is fitted with a series of holes in which locking pins may be inserted to prevent the ramp from shifting.

A rectangular-type ramp is available for use at locations where railroad cars are spotted directly opposite warehouse doors, while a flare type, designed to permit trucks to enter the ramp by turning in from the side, is available for use on open platforms where the car floor is level with or higher than the platform.



The "One Man" bridge ramp. Note lifting handles in floor

The main span of the new bridge, shown here with the falsework bents still in place, is 480 ft. long between centers of the supporting piers. Note old cantilever span in background

Builds New Bridge Across the Kanawha

Project on B. & O. entailed replacement of important 60-year-old structure with one built to carry modern loads—Design and construction procedure embody many noteworthy features

By C. E. SLOAN

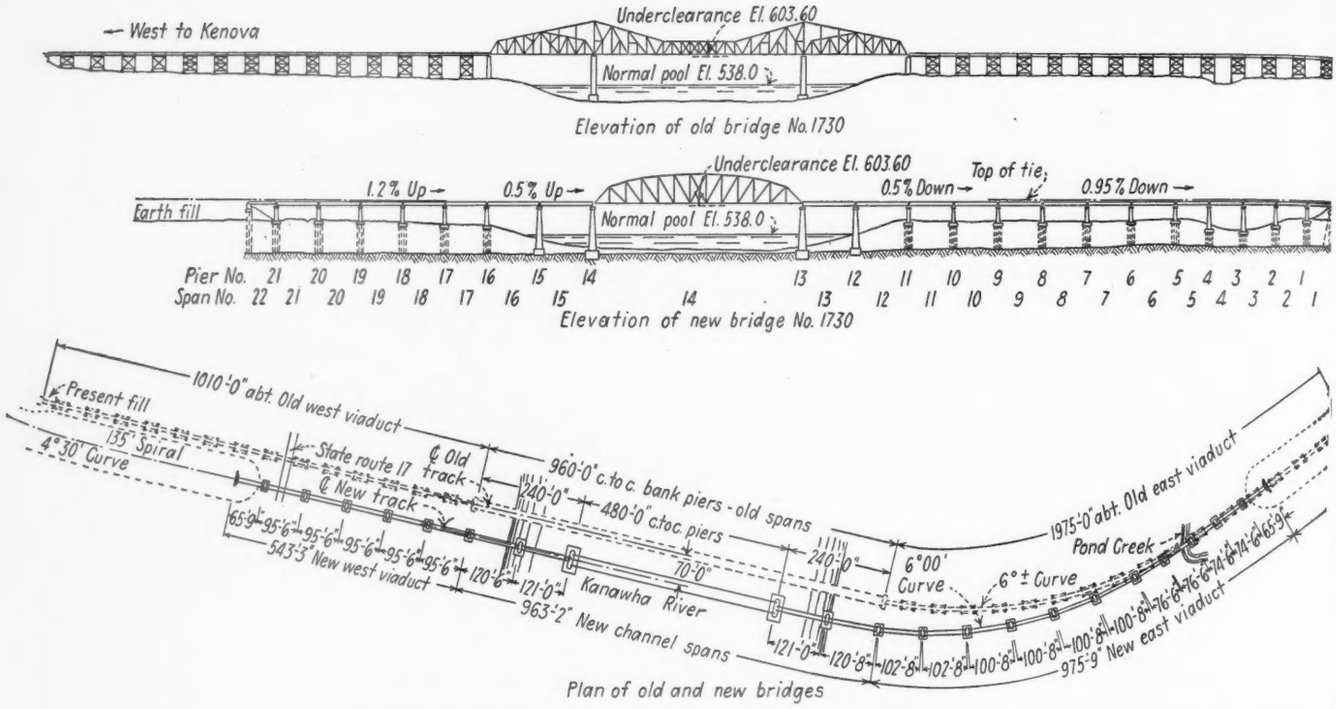
Engineer of Bridges
Baltimore & Ohio
Baltimore, Md.

THE Baltimore & Ohio has recently completed replacement of a large 60-year-old bridge carrying its Ohio River line across the Kanawha river, at Point Pleasant, W. Va., and has also replaced or strengthened 17 smaller structures on that line. While the Point Pleasant bridge can hardly be called unusual in size, it is the largest bridge project undertaken by this railroad in the past 25 years, and contains a truss span exceeded in length by only two other spans on its lines, both of which are located in the Susquehanna River bridge, built nearly 40 years ago. It is further believed to be one of the largest railroad bridges built during the 2½ year period from the date of its authorization, in December, 1944, at the time of the "Battle of the Bulge" in France, to its completion, in May, 1947.

This bridge, originally constructed in 1885-88, crosses the Kanawha river about ¾ of a mile from its confluence with the Ohio river. It bears the number 1730, being located 173.0 mi. from the beginning of the Ohio River line, at Wheeling, W. Va., and 52 mi. from the terminus at Kenova, W. Va., near the Kentucky boundary, a short distance below Huntington. This line connects at the latter place with the Chesapeake & Ohio, and with the Norfolk & Western at Kenova.

The 93-mile section of the line between Wheeling (the first Ohio river objective of the Baltimore & Ohio reached in 1852) and Parkersburg, W. Va., a point on the company's main line between Washington, D. C., and St. Louis, Mo., has long been the more heavily-travelled portion, forming, as it does, part of the company's rail connections to the north and west, and the bridges on this section had previously been strengthened for heavy traffic. The 80 mi. of track between Parkersburg and Point Pleasant were similarly strengthened in 1943, primarily to provide for increased loads and traffic to an ordnance plant located at the latter place. However, because of the limitations imposed by the Kanawha River bridge and other bridges in this territory, the section of line between Point Pleasant and Kenova was held to extremely light loads. The rebuilding of this bridge and the strengthening of the others have permitted the railroad to extend the operation of freight engines having an effect equal to Cooper's E-55 loading, and cars having a gross weight of 240,000 lb., into the territory between the Kanawha river and Kenova.

The old Kanawha River bridge, a



Elevations of the new and old bridges across the Kanawha River, and plan showing aline-

single-track structure, was by far the most important bridge on the line when the road was first constructed. It embodied a cantilever channel span 480 ft. in length between centers of high stone channel piers, which had an under-clearance of 90 ft. above low water, as was required by the state law under which it was built. The anchor arms were each 240 ft. in length, and the anchor piers, also of stone, were 960 ft. apart between centers, being located at the top of the high secondary river banks. Approaches were steel viaducts having an average height of about 40 ft., with tower spans 30 ft. long, and intermediate spans 40 ft. in length. The east viaduct was 1,975 ft. long, and the west viaduct 1,010 ft., so that the total length of the old structure was 3,945 ft.

Renewal of the old bridge was necessitated because of its inadequate capacity for both freight cars and locomotives. The maximum loading permitted was about the equivalent of Cooper's E-30, with single-headed locomotives only and a speed limit of 10 m.p.h. for all equipment. This limited the power permitted to light and obsolete engines, which otherwise would have been scrapped, and to lightly-loaded or partially-loaded freight cars. The speed restriction was difficult to maintain because of the severe approach grades. The original eye-bar anchors had been removed because of corrosion and shifting of the piers, and had been replaced by counterweight boxes, so that extreme care was necessary to prevent overloading and possible uplift at the anchor ends.

The condition of the old masonry substructure made its re-use in a new structure inadvisable; also, replacement of the superstructure with the same or a similar type on the original alinement would have necessitated abandonment of traffic for at least several months. Therefore, authority was asked for a new channel crossing, located 70 ft. upstream, center to center of tracks, from the old structure, and parallel to it.

It was at first proposed to strengthen and retain about 1,200 ft. of the old east viaduct, which was common to both the old and new alinements. Upon further investigation it was discovered that this procedure would be unsatisfactory and unduly expensive, and decision was reached to replace the viaduct with a slag fill, since this material could be placed without distorting the structure.

War Department Requirements

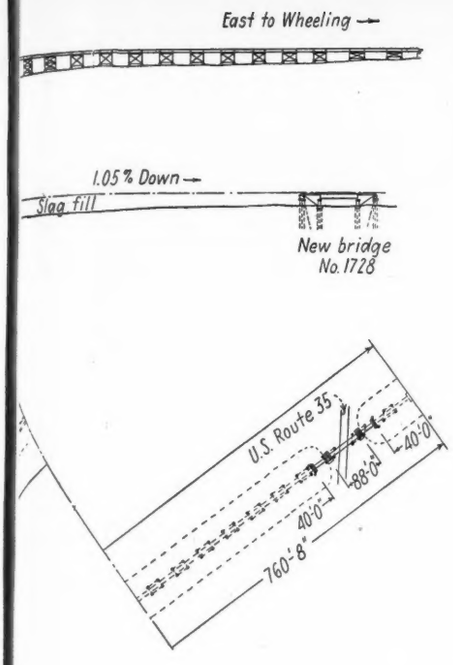
A War Department permit for the project was secured on July 19, 1945. This permit required the maintenance of both overhead and horizontal clearances for the navigation channel. It was hoped to reduce the existing overhead clearance, which was required primarily because of the high smoke stacks of now obsolete river steamers, and thereby relieve the severe approach grades. Also, it was hoped that the War Department would assent to a clear channel of 400 ft., which had been the requirement at the time of original construction, and which is the channel width afforded by several bridges farther upstream.

For some reason, probably one of economy, the old structure had been built to provide a clear channel of about 460 ft., and this clearance was required in the new bridge. Also, the vertical clearance of 90 ft. above low water and 30 ft. above the high water of 1884 (exceeded by the flood of 1937) had to be met. The under-clearance is now 65.6 ft. above the normal pool elevation of the Gallipolis dam in the Ohio river, 12 mi. downstream. This pool surface is nearly 25 ft. above the old low-water datum.

With the project approved and test borings completed soon thereafter, preparation of the plans was rushed to completion, and a contract for the substructure work was awarded on November 10, 1945.

With the minimum horizontal clearance requirement of the channel span increased 60 ft., a plan to use through-truss approach spans incident to the cantilever erection of the main span without falsework in the navigation channel was abandoned, and four 120-ft. deck-girder approach spans, two at each end, were used instead. The use of these girder spans resulted in a considerable improvement in the approach alinement and grades, since they permitted placing the point of spiral to a curve on the east approach, and also vertical curves at each end, close to the main truss span, without complicating the steelwork.

The new bridge, also a single-track structure, was designed throughout for



ments of the two crossings

Cooper's E-55 loads, using a tensile stress of 18,000 lb. per sq. in., and also for Cooper's E-90 loads, using rating stresses (26,000 lb. per sq. in.) and assumed ultimate load conditions. Locomotive loadings equivalent to about E-54 are expected to obtain on this line for an indefinite length of time. The design loadings are considerably lighter than the E-72 now standard for heavy-traffic territory. Special consideration was given to the truss span, which is beyond the limiting length of present American Railway Engineering Association specifications. The impact allowance adopted in the design is that proposed by the Committee on Iron and Steel Structures of the A.R.E.A., which has not yet been formally adopted by that body. This formula provides a reduced impact on stringers and increased allowance on spans of this length.

The new arrangement of channel spans called for a pier within the pool near each shore line. The foundations of these two piers (Nos. 12 and 15) were carried 3½ ft. into shale rock beneath the stream bed, or 43½ ft. and 46½ ft., respectively, below pool level. Footing courses are 24 ft. by 38 ft. and the maximum calculated load is 5 tons per sq. ft. The top of Pier 12 is 100 ft. and that of Pier 15 is 103 ft. above the shale foundation. Each of these piers is a solid shaft, reinforced near the surface throughout its entire height, the reinforcing extending into the foundation.

The foundations of the two piers for the river span (Nos. 13 and 14) were carried about 13 ft. into the shale rock beneath the stream bed, or 55 ft. below full-pool level. The footing courses are 30 ft. by 60 ft., and the maximum calculated load is 5½ tons per sq. ft. Both of these piers are 112 ft. high above shale foundation. Each consists of a solid shaft, with reinforcing arrangement similar to that in Piers 12 and 15.

480-Ft. Main Span

For the main channel span of 480 ft. between centers of piers, a simple type Parker truss having 13 panels was adopted. With the panels 36 ft. 9 in. in length, this span has a total length of 477 ft. 6 in. center to center of bearings. It is 25 ft center to center of the trusses, 65 ft. deep between chord centers at the center panel, and 38 ft. deep at the portals. The top chord of each truss is in the form of a parabolic curve, with splices at each panel point. This produces a much more pleasing appearance than the practice of splicing chords at alternate panel points, which has previously been generally followed for long truss spans built on this railroad. The Parker type chosen is also considered more desirable than the Warren truss previously used, for the reason that the number of vertical tension members is held to the minimum.

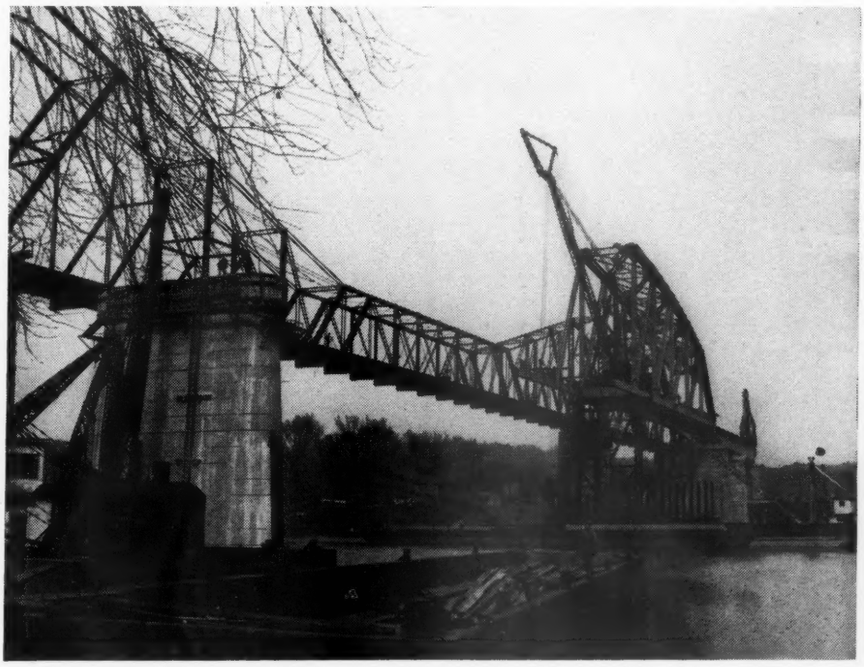
In the design of the hip verticals, which are recognized as a frequent source of trouble, the section was increased about 15 per cent beyond the present specification requirements, which involve consideration of both primary and secondary stresses. The sections of the vertical posts of compression members were also increased for the floorbeam bending. The end-post section was increased for the secondary stresses due to portal action, as calculated by a method proposed by Prof. L. T. Wyly.

For the stringers in the truss span a single line of I-beams of the heaviest section was used, these being designed to meet the 75-per cent maximum impact required for the span length involved. Sliding expansion joints were provided in these stringers on one side of each floorbeam at the east and west L-4 panel points. Considerable attention was given to this feature in order to insure satisfactory design and detail. The steel used throughout was ordinary carbon structural and rivet steel, meeting the A.S.T.M. standards.

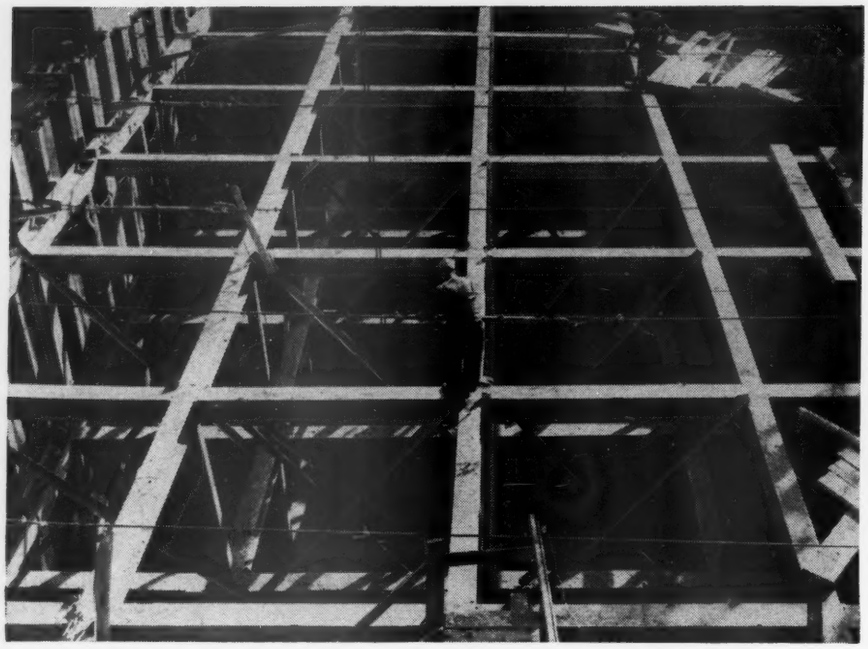
The Parker type of truss, without subpanels, was of considerable advantage in simplifying and expediting the cantilever procedure adopted for erection. Also, it was found necessary to add only about 11,000 lb. of material to take care of stresses induced by this method of erecting the span. The contract for the fabrication and erection of the steelwork was placed on January 28, 1946.

Approach Structures

The new structure on the east, or Point Pleasant, side of the river, replacing the old 1,975-ft. viaduct, consists of the following, beginning at the east end: A slag fill about 100 ft. long, in which a corresponding length of the old viaduct and one old stone abutment are buried; a three-span highway bridge



Steel erection for the channel span of the new bridge was carried out by cantilever method. This view shows the work in progress alongside the existing span



A portion of the sheet-pile cofferdam for the west pier of the main span. The struts, provided in seven planes, consist of 12-in. H-beams

Erecting the steel for the most westerly 120-ft. girder span of the new bridge

(No. 1728) over U. S. Route 35, 168 ft. long between backwalls of the bank abutments; a second slag fill 760 ft. 8 in. long between backwalls of the bank abutments for Bridges 1728 and 1730, in which the old viaduct, including girders, is buried; and spans 1 to 11 of Bridge 1730, consisting of deck plate-girders 65 ft. to 102 ft. in length, on one concrete bank abutment and 11 concrete piers having arched openings. Spans 1 to 4, inclusive, are on the approximate old alinement; the remaining spans are on a 6-deg. spiralled curve in the new alinement.

The viaduct on the west, or Henderson, side, beyond the 120-ft. girder spans, consists of five spans of 95-ft. deck girders, the most westerly of which crosses State Route 17. This viaduct is supported on six open-arched piers and a concrete bank abutment, and is on a tangent alinement throughout. The total length of new Bridge 1730 is 2,482 ft. West of the bridge is a new earth fill about 1,000 ft. long. Approximately one-half the length of this fill was added against the south side of the old fill, at the end of which the old and the new alinements join, a 6-deg. curve on the old alinement being eased to a spiraled 4-deg. 30-min. curve in the new alinement.

The 17 land piers in new Bridge 1730, although varying in height from 32 to 54 ft., are all of one type. Each pier has a continuous foundation slab on concrete-filled steel piling, and two columns, or shafts, connected at the top by an arch forming the bridge seat. All four parts are reinforced to form, in effect, a high, narrow, rigid frame. The columns of the taller piers at a stream crossing (Pont creek) in the east approach are connected above the foundation slab by a reinforced web of concrete 3 ft. in thickness. Use of this type of pier not only effected a considerable saving in concrete but also kept down the load on the piling. Construction of the piers and abutments for the approach viaducts, including Bridge No. 1728, was begun in April, 1946, and completed in November, a period of 228 days.

Foundation Piling

In addition to the 17 land piers and 2 bank abutments in this bridge, the 2 piers and the abutments of Bridge 1728 are founded on piling. The piles used in the foundations are of the cast-in-place type, having fluted shells of No. 7 gage steel, 18-in. diameter butts and 8-in. points. The shells were tapered 10 in. in 40 ft. In placing these piles a 40-ft. length was driven first, after which an 18-in. diameter extension, 20 ft. long, was welded to the 40-ft. section. The upper 20 ft. of each of the concrete-filled piles was reinforced and tied into the footing to provide against uplift,

using a cage of ¾-in. longitudinal rods. The maximum load on these piles, including wind and tractive or braking effects, is calculated at 62 tons.

For the 23 piers and abutments in the approach viaducts and in Bridge 1728 a total of 663 piles was driven. These piles averaged 55 ft. in length, and about 2 cu. yd. of concrete was required to fill each pile. Piles on the Henderson side, where the shale was somewhat deeper, averaged 60 ft. in length. The pile shells were driven from 50-ft., 4-ton swinging leads with a double-acting steam hammer, the leads and hammer being handled by a 20-ton crawler crane, with 60-ft. boom. As was anticipated from the test borings, average driving conditions included about 25 ft. of clay, 25 ft. of sand, which was increasingly wet toward the bottom, and 5 ft. of clay, gravel and boulders before reaching hard shale. The shells were filled with a concrete mix designed to test 3,300 lb. per sq. in.

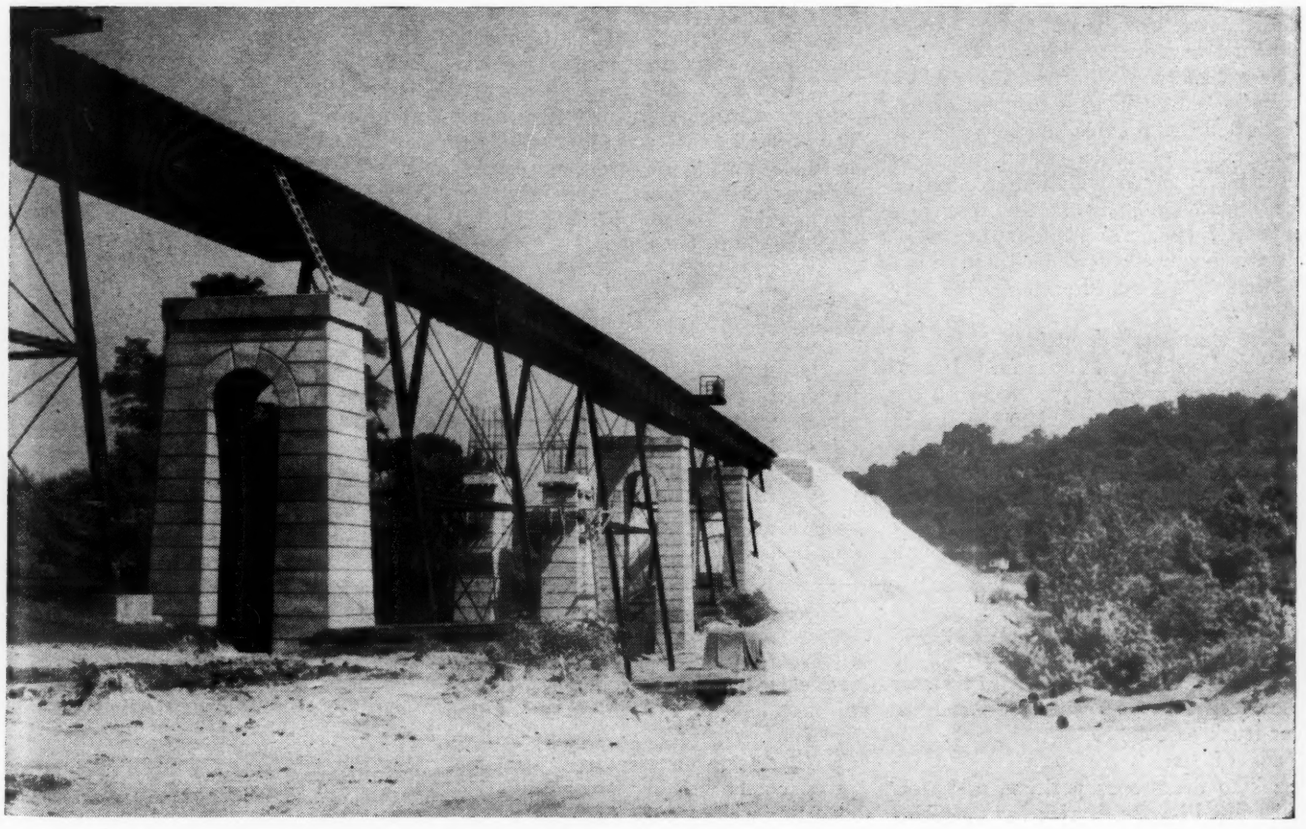
The work on the substructure was carried out by the John F. Casey Company, Pittsburgh, Pa. This contract also included the clearing of the site and preparation of the roadbed. This firm also placed the earth fill on the west side of the river, and distributed the slag in the fill east of the river, as it was deposited from cars by the railroad company's forces. It will also remove the old piers after removal of steel is completed.

In constructing the four river piers the contractor chose to use open steel cofferdams, each consisting of a single wall of deep web piling 48 ft. in length. Cofferdams for the shore piers (Nos. 12 and 15), having 24-ft. by 38-ft. foundations, were made 38 ft. by 52 ft. in size. The cofferdams for the main piers (Nos. 13 and 14), with their 30-ft. by 60-ft. foundation courses, were made 45 ft. by 76½ ft. The sheet piling in these latter cofferdams was placed in an average of 30 ft. of water, 6 ft. of muck and sand, and 5 ft. of clay, sand, gravel and boulders, a total of 41 ft., leaving about 7 ft. of freeboard at normal pool.

A steam derrick boat with a 68-ft. boom drove the sheeting, no leads being used. The sheet piles were driven one to two feet into the shale to refusal. The walers in the cofferdams for Piers 12 and 13 consisted of six lines of 12-in. 106-lb. H-beams extending around the walls on the interior. Later these cofferdams were removed and placed for Piers 15 and 14, respectively, and when this was done an additional line of walers, to make a total of seven, was added. The interiors of the cofferdams were strongly braced with H-beam struts, placed both transversely and longitudinally, and diagonal angles were used at the corners. Diagonal bracing was placed between the long walls of each cofferdam to brace against unbalanced pressures from fill, which was removed from the interiors with a one-yard clam shell bucket and distributed as evenly as practicable around the outer walls.

When excavation reached shale, the cofferdams were dewatered and in each of them a concrete seal about 3 ft. deep was placed between the footing line and the cofferdam wall. This was done in sections and in such a manner as not to disturb the hold of the sheeting in the shale. The top of this concrete seal, which formed a ledge around the footer pit excavation varying in width from 7 ft. to 8 ft. 3 in., was so formed as to drain the seepage water coming in through the sheet piling to a sump at one corner, where a 12-in. 75-hp. well pump, with a capacity of 3,700 gal. per min., carried it to the outside.

Allowing a setting-up period of 24 hr. for this concrete, which had been placed with the cofferdam dewatered and comparatively in the dry, excavation for the footer, or foundation, course was begun in the opening left through the seal. For the two piers at the ends of the main span, this excavation was carried about 14 ft. into the shale. Blasting was resorted to for loosening the shale. A 6-in., 15-hp. well pump, with a capacity of 500 gal.



Construction view of abutment and piers at extreme easterly end of the east approach. A 760-ft. section of the old viaduct is buried in the new fill shown in background

per min., picked up the seepage water coming in through the sides of this pit and below the seal, and carried it to the ledge formed by the top of the concrete seal, where it drained to the sump pit in which the 12-in. pump was operating.

Work on the cofferdams for the river piers was started by the Casey Company in late March, 1946, and was completed on February 4 of the following year, a period of 316 days.

Erecting the Steel

Steel grillages were placed and encased only in the tops of Piers 13 and 14 for the receipt of the truss span. Steel erection, with the exception of these grillages, which were placed in connection with the substructure work, began with Bridge 1728, all three spans of which were placed between trains on December 7, 1946. The new 90-ft. main span of this bridge, weighing 65 tons, was assembled alongside the old viaduct while it continued to carry traffic, and the deck was placed. Then, after the old viaduct had been removed, the entire load of 86 tons was lifted into place with one extremely powerful derrick car (80 tons capacity) on the track and a crawler crane working on the highway.

Spans 1, 2, 3, 4 and 5 in the east viaduct were placed successively in the next two weeks, all moves being carried out between trains, and as portions of the old viaduct were removed. The ends of Spans 4 and 5 were placed in temporary offset position over Pier 4, where the new alinement drew away from the old viaduct. A turnout for the new track was provided on new Span 4, over which erection equipment was moved to proceed with the erection of the remaining spans in the new east approach vioduct. These spans were placed completely assembled and riveted, and with decks in place, by the derrick car.

The steelwork for Bridge 1728 was delivered to the site in railroad cars. To facilitate erection, the steelwork for Bridge 1730 was handled to the site in barges by the erector, who also constructed a temporary wharf on the river bank and a 1,200-ft. standard-gage track from the temporary wharf to the end of the slag fill, near the east abutment of Bridge 1730. A stiff-leg stationary derrick, with 60-ft. mast, 130-ft. boom, and of 100 tons capacity, was placed on a foundation of 12 timber piles on the bank behind this wharf, to transfer the steelwork from barges to railroad car-truck assemblies on this track. The loads of steel were moved along the track to the proper position, and were then lifted by the derrick car operating on the new bridge. The procedure was for this car, moving westward along the new structure, to erect a span on which a temporary deck was then placed, in order to permit the derrick car to advance for erection of the next span. Twelve of the east approach spans were placed in this manner. Span No. 13, 120 ft. in length, was, however, set in place by the stationary derrick on the wharf, since it could be handled directly to position by the 130-ft. boom. This span was erected on January 10, 1947, one month after Span 1.

For Spans 10 and 11 of the east approach second-hand girders were used, after remodeling by the fabricator. These girders were originally built of iron in 1890, only two years after the completion of old Bridge 1730. They have square ends, and were originally used in a double-track through plate-girder span, and were readily adaptable to re-use as deck girders in this bridge. The capacity of these double-track girders, based on the allowable stresses for iron, is equal to that of the other single-track girder spans in this bridge.

In erecting the main span of the new bridge the first falsework bent was placed two panel lengths, or about 74 ft., from Pier 13, the east pier of the channel span. The steel for the first two panels of the trusses was placed by the derrick car standing on Span No. 13. The east end is the fixed end of the truss span, and in order to provide for any uplift that might be induced by the centilever method of erection, and also to provide against wind forces, this end was secured to Pier No. 13 by means of hitches or temporary anchorages, which were removed after the truss span had been completely erected. The derrick car was then used to assemble an 86-ton traveler derrick, having a capacity of 60 tons, on these two panels. This derrick had a 40-ft. mast and 90-ft. boom revolving through an angle of 270 deg.

Falsework Described

The steel falsework bents used by the erector were of a type that is now more or less standardized in work of this kind. The lower part of these bents consisted of a steel frame or cage, lowered between two barges, and held suspended in proper position until four corner piles could be driven and the cage attached to them for support. Steel bracing piles were then driven through guide openings in this cage into the shale and were capped in pairs by a cross beam of two channels, bolted through holes in the piles, and adjusted by shims. The cross caps and cage held the piles together, forming a steel pier in which the bracing had been carried well below the water surface. A group of beams was placed on the cross caps, between the piles, for receipt of a two-column bent, which transferred the load from the panel point of the truss to the cross caps. Two 500-ton hydraulic jacks placed under a movable head or cap over the top of each bent column provided a means for adjusting the elevation of the truss by permitting the insertion or removal of bearing shims between the columns and this cap.

The placing of the first falsework bent and the first two panels of the truss was completed on January 24, two weeks after the completion of Span 13. The second falsework bent was placed five panels out from the east pier, and the erection of the truss span reached this point on March 3. By this arrangement of falsework bents, only two of which were in the river at one time, two channels, each about 170 ft. wide, were provided for navigation. The remaining five panels of steelwork of the truss span beyond Bent 3 (or rather the second position of Bent 1) were placed March 3 to March 10, thus closing the truss span. The elevation of the tops of the falsework bents had been determined with such exactness as to permit landing of the trusses on Pier 14 without further adjustment, the jacks being used only to remove the bearing shims on the bents after the riveting of the bottom chord and its connections had been entirely completed.

An Anxious Period

All steel in the new truss span was handled by the traveler crane directly from barges beneath the bridge; it was unloaded as needed, and consequently did not have to be brought over the new structure. The two 120-ft. 50-ton girders of Span 15, in the west approach, were also hoisted directly from barges, and this span was assembled by the traveler crane in position for riveting only two days after the truss span was landed.

The period of two months from January 10 to March 10, 1947, between the placing of Span 13 and the closing of Span 14, during all of which time falsework had to be maintained in the river, was a very anxious one for all interested in the structure. This was particularly so of the last seven days of this time, when the final five panels over the west channel were being placed with all possible speed. This anxiety arose from the threat of damage to the falsework and consequent loss of the span from floating ice, collision with the long tows of heavily-loaded barges, and the unpredictable floods in both rivers, which are generally most feared in early spring. However, none of these threats materialized, and the landing of the span was an event of considerable relief to the erector's manager and superintendent, as well as to the writer,

(Continued on page 51)

Public Looks to Railroad Management for Better Service

Latest Opinion Research poll's results are summarized

WHILE there is no evidence of any increase over the past year in sentiment for government ownership of the railroads in the United States, and while the public still considers the railroads by far the most important form of transportation, it does nevertheless continue to be critical of the railroads' performance, in some respects more critical even than last year, and to an increasing extent it puts the blame for unsatisfactory performance, particularly in passenger service, directly on railroad management, rather than on the war or other general conditions. These are some of the conclusions of the 1947 survey of public opinion made for the Association of American Railroads by the Opinion Research Corporation of Princeton, N. J.

As the seventh annual survey of this type made for the railroads, this study gives, in conjunction with those preceding it, a graphic portrayal of the development of trends of public opinion, favorable and unfavorable, about the railroads and their standing in relation to competing forms of transportation. The findings are based on 2,583 personal interviews made between April 17 and May 5 with a nationwide sample of the voting population, selected by a technique worked out through long experience. The number interviewed in 1947 compares with 2,452 polled in 1946 and 2,492 in 1945.

Know Railroads' Importance

"In a series of studies of this kind, where one of the principal purposes is to measure trend of opinion, it is important the sample remain comparable from one survey to the next," the O. R. C. comments. "Certain variations from a total population cross-section are followed in setting up a voting cross-section to allow for the political weight of certain groups. For example, more interviews are allotted to men than to women because men vote in higher proportion than women. . . ." Of those interviewed this year, 57 per cent were men and 43 per cent women; 56 per cent were in the middle income bracket; 44 per cent were 45 years of age and over; 42 per cent lived in a rural community; and 38 per cent hailed from the Middle West and 37 per cent from the East. On the questions dealing with freight rates, a special geographical grouping was made to conform with the three freight rate territories.

With respect to government ownership of railroads, only 12 per cent of the public, according to the survey, think it would be a good thing for the federal government to assume that responsibility. The 1947 figure compares with 22 per cent in 1945, 14 per cent in 1944, 16 per cent in 1943, 29 per cent in 1942 and 46 per cent in 1941. "Last year, 13 per cent favored government operation," the O. R. C. commented. "A difference of this size is within the range of sampling variation and should be interpreted as indicating that sentiment remains virtually unchanged."

Of those favoring government operation, 29 per cent contended the government could provide more capable, efficient management; 23 per cent asserted the government could keep down strikes; and 21 per cent maintained that government ownership would hold down rates and profits. Opposition to government ownership stemmed largely from objections to the principle of government in business.

Seventy-one per cent of those interviewed told the O. R. C. that of the four types of common carriers the railroads are the nation's most important carrier, followed by trucks, air lines and water transport. At the same time, 70 per cent expect the railroads to lead competing forms of future transportation in the volume of freight traffic, while 56 per cent think the railroads will carry the most passengers.

The survey also disclosed that "more than a third" of the public contend that the railroads are not giving as good service as they should; 36 per cent said they could give better service and 59 per cent believed the railroads are doing the best they can. "Of special importance to the railroads is the finding that frequent train travelers (people who have made 10 or more trips by rail in the last year) are more critical than the general public," the O. R. C. noted. "Forty-seven per cent say the railroads could give better service. Last year, only 41 per cent of frequent travelers felt that way."

The survey found that nearly half the public believe that freight shipments are not going through satisfactorily. "The public appears to be well aware of the reason for shipping difficulties," the O. R. C. said, adding that the principal reason given by the 46 per cent who believe there have been serious delays in freight shipments is lack of equipment. The survey also indicated that mention of the shortage of manpower has declined from 27 per cent in 1946 to 19 per cent in 1947.

Ask for More Courtesy

With respect to passenger service, it was found that 22 per cent have heard criticisms of such service recently—a decline of 11 per cent under 1946—and that of that group, only 14 per cent mentioned overcrowding, as compared with 43 per cent in 1946 and 64 per cent in 1945. Of the 1947 complaints, 42 per cent were directed at dirty, uncomfortable and old cars and 24 per cent toward trains being late. Twenty-six per cent of those polled found passenger train and station washrooms to be in good or excellent condition, while 18 per cent said they were fair and 24 per cent asserted they were bad or very poor.

According to the survey, the responsibility for unsatisfactory passenger service is increasingly being placed directly on railroad management, that percentage increasing from 11 per cent in 1945 to 46 per cent in 1947. It indicated that among those who have heard complaints of passenger service, fewer placed the blame on present conditions or lack of personnel. Only 14 per cent criticized railroad employees, as compared with 17 per cent in 1946, 13 per cent in 1945 and 7 per cent in 1942. Nearly 49 per cent of the people who made a train trip recently said they felt railroad employees are more accommodating than they were a year or so ago—an increase of 16 per cent over 1946—while of those who have heard complaints about passenger service, 16 per cent mentioned rude or careless employees. The survey also found that more courtesy and a generally better grade of service are the chief improvements the public would like to see.

Twenty-six per cent of those polled said that the railroads should improve their equipment in order to make the

public use the trains more. Other suggestions were: lower fares, better service, cleaner trains, faster service, better schedules, more safety precautions, cheaper food and more diners, and more excursions. In this respect, the survey noted that 39 per cent of recent air line patrons contended that improved equipment would be most likely to induce them to use trains more often, and that 56 per cent of those polled said they knew of no improvements in equipment or service having been installed by the railroads since the war.

According to the survey, the growing trend in public preference for air travel has been halted, at least temporarily. "Since 1943, when this issue was first checked, the proportion favoring railroads over air lines had shown a decline until, in 1946, almost as many preferred airplanes as preferred trains," the O. R. C. said. "The current survey shows a reversal of this trend, with railroads gaining slightly, and air lines losing correspondingly in public favor."

Fifty-one per cent of the public said that they would prefer to travel by train and 49 per cent by plane if fares were equal. It was found that preference for railroad travel is strongest among people over 45 and among Southerners, but that 65 per cent of those under 30 and 81 per cent of those who have taken a recent commercial plane trip prefer air to rail travel. Among the so-called "frequent train travelers," 49 per cent said they preferred trains and 50 per cent planes.

Some Call Air Travel Safer

With respect to questions dealing with the comparative merits of rail and air safety, the survey showed that (1) 27 per cent of the public likes traveling by railroad best because "it's safer"; (2) 60 per cent of the people said railroads are safer than air lines and 13 per cent said air lines are safer than railroads; and (3) those who have recently traveled on a commercial air line agree that railroads are safer.

The survey also revealed that spaciousness of trains, the freedom of movement that is possible and dependability are the strongest appeals of rail travel, while speed is the chief advantage of traveling by plane. On the comparative comfort of plane travel versus train travel opinion was evenly divided.

Thirty-six per cent of the public agreed that air lines have the friendliest and most courteous employees, while 9 per cent said that railroads have and 16 per cent said they're both the same. Of those who have had recent contact with air lines, 71 per cent said the air line employees are friendlier and more courteous, while only 4 per cent thought that railroad employees were better in this respect.

With respect to railroad profits, the O. R. C. found that 65 per cent of the public thinks the railroads are making a profit and 8 per cent believes they are making too much profit. These figures compare with 74 per cent and 10 per cent, respectively, in 1946.

"The proportion of people who have a correct conception of railroad earnings has increased slightly since last year, but still represents only a small minority of the total public," the O. R. C. said in summary. "About 14 per cent of those who believe the railroads are making a profit think that profit is 5 per cent or less. Last year only 8 per cent thought this. The average (median) estimate of railroad profits is 12 per cent compared with 15 per cent in 1946. But, as in 1946, 24 per cent think the railroads are making at least a 20 per cent profit. And 41 per cent of those who think the railroads are operating at a profit have no idea how much the railroads are earning. . . . The public's average estimate of what constitutes a fair profit for the railroads is the same as last year—10 per cent. More than three-fourths of those who express an opinion feel that 6 per cent or more would be a fair profit."

Results of the survey also showed that a majority of the public estimate that at least 500,000 people own stock in railroads and that 21 per cent selected the approximately correct figure of 1,000,000 when shown a list of the possible number of stockholders. "But a large proportion of the people have no adequate conception of the function of the stockholder in business today," the O. R. C. said. "Less than half of the people consider stockholders as part owners of the railroads."

With respect to freight rates, the poll indicated that most of those who know of last January's increase in freight rates feel that it was justified and that it will have relatively little effect in retail prices. The comment noted that the interviews on the freight rate question were completed before the Supreme Court upheld the No. 28300 order.

The survey disclosed that (1) 24 per cent thought there had been a change in rail freight rates recently; (2) 22 per cent said freight rates were raised; (3) 1 per cent thought they were lowered; (4) 1 per cent didn't know whether the rates were increased or decreased; and (5) of those who knew there had been an increase, approximately 2 per cent had a reasonably accurate idea of the amount of the increase.

The poll also brought out that the 22 per cent who know of the increase, 15 per cent thought it was justified, 4 per cent said it was not and 8 per cent said they had been affected by it through retail price increases which, they contended, have been "relatively slight."

According to the survey, criticism of freight rates went up "slightly" in 1947 "apparently because of the increase in rates." Adding that a fifth of the public nationally, and more than a third of those in South, reported awareness of criticisms of freight rates, it said that the pattern of criticisms has changed in 1947, with less emphasis on sectional inequalities and more complaints about the general level of rates. "More Easterners and Southerners [in 1947] than in 1946 feel their rates are higher than elsewhere in the country," it said.

Turning to government aid to transportation, the O. R. C. said that the 1947 survey provided further corroboration of the fact that the public is poorly informed on the subject of government assistance to the various transportation systems and that people are likely to approve government aid to any carrier particularly when they think it would directly benefit the public.

Don't Quail at Subsidies

"Among those with opinions, railroads are named most frequently as the form of transportation now receiving most help from the government," the O. R. C. continued. "Twenty-four per cent say the government is helping the railroads most, mainly through subsidies and loans; 20 per cent think the air lines are getting most help, mainly in the form of airport construction and loans and subsidies; 6 per cent name bus and truck lines as receiving the most help, through highway maintenance and construction; 5 per cent believe river and canal boats are getting the most government aid, through maintenance of waterways; 7 per cent think all four are receiving the same amount of help; and 38 per cent have no opinion." The survey pointed out that in reply to a question in the 1945 survey as to which type of transportation had received the most help from the federal and state governments, 39 per cent named the railroads, 17 per cent the air lines, 8 per cent the motor carriers and 6 per cent the water carriers.

The public's response to this year's poll also indicated that (1) the air lines should be financially aided by government funds because they represent progress and because new forms of transportation should be encouraged; (2) the railroads should be aided because they are essential and "we need them"; and (3) the bus and truck lines should be aided because they are good for the country, in the public interest and essential.

"Those who disapprove of one form of transportation receiving more aid than others argue principally that this is contrary to the principle of fair play —all forms should be treated alike," it said.

An Evaluation of Railroad Motive Power

Four fundamentals of the economic value and utility of the motive-power types—Characteristics of steam, Diesel-electric, and electric locomotives—Prospective types

PART I

By P. W. KIEFER

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[*This article, of which the first of two parts appears herein, is an abstract of a document prepared by the author to serve as the material from which to prepare a lecture of limited length for presentation before the Institution of Mechanical Engineers, London, England, during the Centenary Celebrations of that Institution which were held in June, 1947. The Centenary program included three addresses under the general title of "Railway Power Plants," in which were developed, respectively, the viewpoints of the British, France-Western Continental Europe, and the United States. The abstract, begun in this issue, has been confined largely to motive-power developments on the New York Central System.*—EDITOR.]

THIS discussion of the fundamentals of the selection and use of railway motive power is developed largely from studies conducted and results obtained by the New York Central System, particularly those of the past decade, and our relatively near-term plans and objectives for the future evolution of road-service motive power. We shall dispense with statistical comparisons of detailed operating and cost data from other sources because, unless all essential information is available and included for strictly comparable conditions, the results may be confusing and misleading. Recourse to the use of assumed conditions is of little avail in reaching reliable conclusions.

Fundamentals of the Problem

From present experience, it appears logical that judgment of the possible economic value, utility, and attractiveness of new forms of motive power, either now in use or under development, may best be predicated on four basic considerations.

It should be understood that these four fundamentals are not here set forth in absolute order of importance because, while not inseparable, they are closely related and, to a greater or lesser extent, the influence of one may affect the value of one or more of the others.

Availability and Utilization—Availability is here defined as the percentage of total time that a locomotive is available for service; utilization represents the percentage of total time it is actually in operation and is dependent in large part on the arrangement of schedules. As herein applied, availability means also continuity of operation on the road in terms of reduced delays chargeable to the locomotive and the resulting possibilities of progressively shortening schedules without incurring the high and burdensome expenditures necessary for the improvement of trackage installations, including signals and related facilities, to permit increases in permissible operating speeds. Improved rights-of-way and operating practices are essential, but the final results depend also on the locomotive's ability to support the more intensive utilization demands.

The term availability does not here mean the percentage of time available for a given assigned or selected run which daily may require only a portion of each twenty-four-hour period, with ample time remaining for necessary current maintenance attention. This is accented because not infrequently claims for availability up to 100 per cent are predicated on such operations.

Constantly increasing availability of motive power, with opportunity of correspondingly improved utilization, is an absolute necessity to keep traffic on the rails in the face of the ever-mounting competition of other forms of transportation, usually subsidized, and to build up such traffic. This trend and need cannot be interrupted and must be faced resolutely and realistically.

Costs of Ownership and Use—It is a self-evident fact that, under the incentive system of free enterprise, costs which prevent a fair return on the investment are destructive and self-defeating. Obviously, this fundamental requires careful attention.

Engineering and technological progress alone is not enough. Without sound economic and social enlightenment and a revival of the age-old truth that "something for nothing" cannot be obtained, the potential and productive results of such gains can quickly be nullified and the intended purposes defeated. This is a challenge principally to statesmanship, labor leadership, and business to formulate, adopt, and carry out policies known from the lessons of history to be necessary for the continuation of human progress. If the net earnings of the railroads or other legitimate undertakings are destroyed or unduly restricted, the advantages of engineering and related accomplishments, which otherwise would be made available to all, will be definitely limited or completely eliminated.

Capacity for Work—A motive-power unit must possess a reasonable margin of capacity over that necessary to perform the appointed task if such a unit is to contribute to the betterment of rail transportaion. Today, rapid acceleration from rest or back to permissible running speed following slow-downs is a much-desired characteristic in addition to the established capacity of the machine for straightaway running.

Performance Efficiency—Performance efficiency is an important economic consideration. With other essential requirements fulfilled, there is no question but that a major improvement with respect to motive-power fuel economy would be of far-reaching importance to the railroads and to the country.

Steam Locomotive Development

To avoid an undesired digression, in describing briefly the characteristics of the more important kinds of motive power, the questions of improved appurtenances and details of design, materials, and contribution, which contribute to

the success of the complete locomotive, have been excluded.

Over the years it has been our unceasing determination and practice to advance the design of the reciprocating steam locomotive, not only to achieve progressively better results therewith, but also to enforce constantly higher standards for new and competing forms of motive power which, in turn, has accelerated the development and improvement of reciprocating steam. As a self-contained power plant, it provides horsepower at the lowest initial cost of any type of locomotive now used or under consideration. Much should be done, however, to increase its usefulness by providing greater freedom from failures and detentions en route and reducing time now used for maintenance, servicing, and inspection. Otherwise, it may not be able to compete on its merits with other forms of motive power and will be faced with a restricted use and market.

With these major objectives constantly in view, it has been our endeavor for succeeding reciprocating steam designs steadily to decrease weight per horsepower developed and to increase the steam-generating plant and drawbar-pull capacities and overall thermal efficiencies. The mechanical efficiencies have also been increased through the application of roller bearings and by other means. Improved distribution of wheel loads and progressively bettered counter-balancing for reduction in the effects on rail and roadbed under high-speed operation also have been sought. Long experience has shown that this practice is of great assistance in the maintenance of rail line and surface for good train-riding qualities, even though the roadbed and track structure used has been second to none.

As an illustration of the fact that with good designing the effects of reciprocating overbalance can be well controlled, it may be said that in 1938 a series of slipping tests were conducted on the New York Central over a short stretch of main-line track with 127-lb. rail section on rock ballast. Test runs were made at train speeds varying from 61 to 82 m. p. h. and with maximum slipping speeds of 123 to 164 m. p. h. while working steam. In the tests at the lower speeds no wheel lifting occurred, but in the final run at a revolving speed of 164 m. p. h. the main drivers only lifted slightly, and later examination disclosed a number of very slight markings on the rails which, however, were without significance and had no effect on the rails or track structure requiring attention by maintenance forces. No damage to the locomotive occurred in any of these tests.

At the same time, in the advancement of reciprocating steam, tender design and capacity have gone forward apace for the lengthening of runs between fuelings and the taking of other supplies. The use of one-piece cast-steel locomotive frames with integral cylinders, cast-steel trucks — leading, trailing, and tender—and integral cast-steel tender frames, the latter installations being of water-bottom design, for definitely reduced maintenance attention, shopping time, and some weight saving, has been in effect for years on all system steam locomotives built and more recently for the trucks of switch and road Diesels. The underframes and trucks on electric locomotives also have been of this design.

These various features and practices have led to higher availability and serviceability with corresponding increases in miles run per year and mileages between classified repairs.

As a condensed and convenient means of illustrating the evolution of reciprocating steam power on the New York Central System during the past two decades, Table I and Fig. 1 are presented. Table I reveals the progressive increase in capacity and size as necessitated by the demands for higher speeds and heavier trains, and the concurrent reduction in engine weight per indicated horsepower, which has been over 30 per cent in the period. Fig. 1 shows the coincident growth of drawbar pull and horsepower of over 100 per cent and the ascending speeds at which maximum capacities have been attained.

N. Y. C. Class S-1 4-8-4 Type

The culmination of this work to date is represented by the Niagara 4-8-4 type*. A basic principle in this development was the incorporation of capacity in excess of that required for current work to be performed in order to obtain the greatest possible continuity of operation, reduced time and expense for maintenance, and possible shortening of schedules. That this principle was correct has already been demonstrated by the performance obtained since the engines were placed in regular service beginning in October, 1945.

Boiler maintenance as compared with other types of high-speed design has been almost negligible up to the present time. The first engine shopped for classified repairs after running approximately 255,000 miles required practically no such work except tube removal.

Mileage between tire turnings has averaged about 190,000 with individual engines running as high as 235,000 miles compared with about 100,000 miles heretofore. This high mileage is attributed to the high factor of adhesion and the consequent absence of slipping,

* Described on page 480 of the September 22, 1945, *Railway Age*.

together with the design of spring equalization system which uses coil springs at the connection with the frames, the lower initial resistance in trucks, and the use of lateral-motion devices on front and intermediate driving axles, all of which increase the flexibility of the driving machinery and permit automatic adjustment against variations due to cumulative wear.

While of an entirely new design, the conventional fire-tube boiler has been retained, but elimination of the steam dome permitted increased barrel diameter with corresponding increase in furnace volume and gas areas. Shell courses are made of carbon-silicon steel to save weight. The present working pressure is 275 lb. per sq. in., but the boiler is designed at a minimum factor of safety of 4.5 with 290 lb. per sq. in. pressure, whereas the minimum factor under Interstate Commerce Commission regulations is 4.00.

The front-end arrangement, similar to that on all modern system power, was proportioned from principles developed in a comprehensive series of stationary boiler tests of a kind first undertaken on Class J-1 locomotives in 1937. With the proper relation of exhaust nozzle and stack and the other essential features and dimensions established, this arrangement results in increasing the flow of the gases with no corresponding increase in the quantity of steam, and effects a reduction in back pressure which is reflected in increased cylinder horsepower and overall thermal efficiency. Another advantage is that no change in stack dimensions or reduction in exhaust-nozzle diameter is necessary for winter operation.

Advanced Rod Design

While all power developed is delivered through a single pair of main crank pins, the bending strains on these pins are reduced about 50 per cent as compared with the conventional drive by means of an advance design of roller-bearing rod in which the piston thrust is transmitted in a straight line through the main, intermediate, and rear side rods. With the conventional rod arrangement, it would not have been practicable or prudent to attempt delivering the high horsepower of this locomotive through one pair of main crank pins.

Lightened alloy-steel revolving and reciprocating parts have been used with cross-counterbalance to reduce dynamic augment and resulting stresses in rail and roadbed. The reciprocating parts weigh 1,649 lb. per side and 22.4 per cent are balanced.

Through the use of a new design four-wheel trailing truck, the ash hopper is enlarged to the extent of providing one cubic foot of volume for each square foot of grate area, which is the largest ratio thus far obtained in system locomotives.

Driving wheels are 79 in. in diameter, but the frame is arranged so that wheels ranging in diameter from 79 in. to 75 in. may be used, depending on future requirements for passenger or freight service. One-piece integral cast-steel frames and cylinders with cast-steel trucks and the integral cast-steel water-bottom tender frame previously developed and used on other modern power were applied to these engines.

An open-type feedwater heater and an extra large superheater are installed, both contributing to the overall steam generating capacity and efficiency.

To save weight, aluminum is used for cabs and running boards. Axles are made of carbon-vanadium steel and crank pins of Timken High-Dynamic steel, while main and side rods are manganese vanadium.

Shields were applied at the smokebox sides to neutralize the vacuum effects ahead of the cab, and, due to the arrangement of deck and seat boxes, the degree of visibility from the cab is superior to that of other modern system locomotives having fully satisfactory conditions, regardless of the large diameter shell courses.

Cast-steel pilots and drop couplers, first applied in 1927 to the J-1 class 4-6-4 type and since continued on all modern passenger power for increased safety of movement, were used also on these Niagara type engines.

For increased availability and continuity of operation, an extra large capacity tender of bed type design, now also installed back of the 50 Class J-3 and 15 Class J-1 Hudson type engines, carrying 46 tons of coal and 18,000 gal. of water, was provided, the water capacity being ample when scooping from track pans. The running gear forming a part of this tender design originated on the Union Pacific but was introduced for the first time on our system as a part of the S-1 development to permit the use of the 4-8-4 wheel arrangement for the locomotive, necessary for high power capacity without exceeding a total wheel base which would allow convenient turning on the 100-ft. tables still in use at several of the important main-line terminal points. Meanwhile, alternate designs of swivel-truck-equipped tenders, to accomplish the same purpose, are now being developed for possible future use.

A specially important feature of these tenders, worked out and perfected on our system, is the tank venting arrangement which allows scooping water at maximum operating speeds and is so designed as to protect from breakage the windows of trains passing on track pans in the opposite direction and at the same time prevent harmful effects to the track ballast due to overflow.

Capacity tests with 79- and 75-in. driving wheels have been made, from which the horsepower characteristics shown in the tables and charts have been derived. These tests were conducted under regular road conditions of operation and indicate what can be obtained daily in actual service.

One S-1 with Poppet Valves

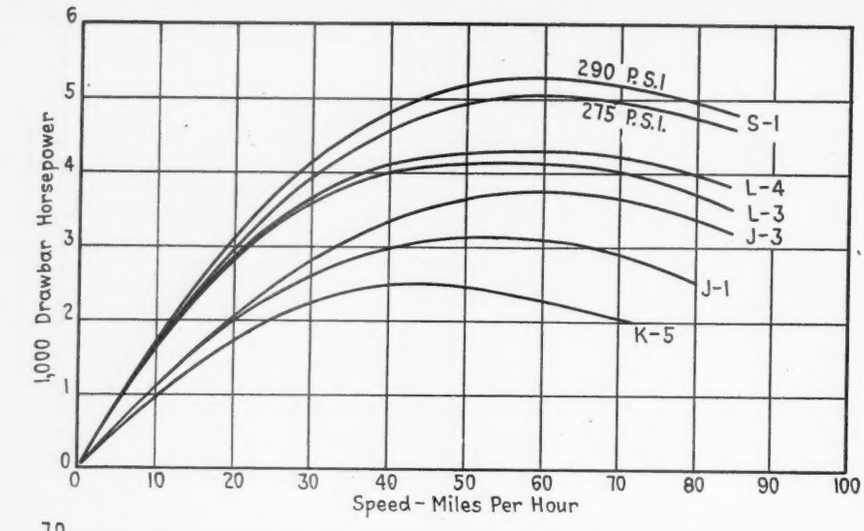
When the New York Central S-1 engines were ordered, it was decided to equip the last one of the lot with the Franklin poppet-valve arrangement having four intake valves 6½ in. in diameter and six exhaust valves 6 in. in diameter per cylinder. With this single exception, the engine is identical with the others, all of which have large-size piston valves actuated by modern valve gear.

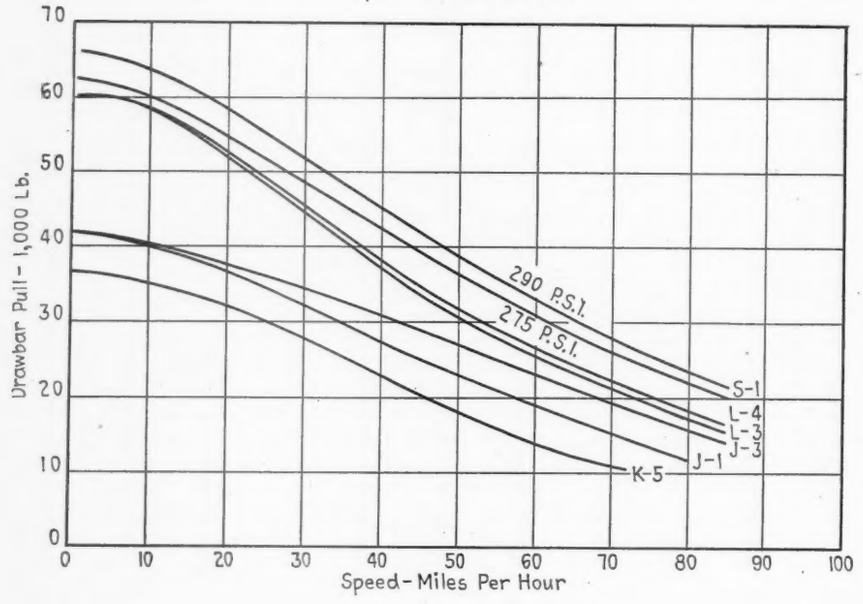
Thus, a means for making an exact comparison of capacity, acceleration, and performance for these two kinds of steam distribution was made available, and comprehensive road tests with a dynamometer car are now being conducted with the poppet-valve engines which, with the tests already made of the piston-valve-equipped S-1, will give this exact information. So far as is known, this will be the first such comparison made in the United States on modern high-powered locomotives. When worked up and analyzed later during the present year, the data should provide a basis for definite conclusions.

Other Coal-Fired Locomotives

In the constant search for better motive power the railroads of the United States have not been content to confine their endeavors and anticipations to the reciprocating steam or the present oil-burning Diesel-electric. The advantages stemming from the continued large-scale use of bituminous coal as a basic motive-power fuel in the United States are numerous and far-reaching, and for the retention and expansion of these benefits several important steps already have been taken and plans for new designs of motive power are under development, such as the Pennsylvania stoker-fired non-condensing steam turbine having mechanical transmission; the three high-powered electric-drive steam-turbine passenger locomotives having a conventional fire-tube stoker-fired boiler now being delivered to the Chesapeake & Ohio, and the gas-turbine-electric using bituminous coal as the basic fuel, two of which are now under development for a group of eastern roads.

Electric locomotives have many advantages. The power being supplied from an outside source provides capac-





Loco. Class	Dia. drivers, in.	Working press, lb. per sq. in.	Maximum i.hp.
S-1	79	290	6,900 at 85 m.p.h.
S-1	79	275	6,600 at 85 m.p.h.
L-4	72	250	5,400 at 76 m.p.h.
L-3	69	250	5,200 at 72 m.p.h.
J-3	79	275	4,700 at 77 m.p.h.
J-1	79	225	3,900 at 66 m.p.h.
K-5	79	200	3,000 at 54 m.p.h.

Fig. 1—Power and traction characteristics of reciprocating steam locomotives

ity to the limit of adhesion for short periods, and the characteristics of design permit maximum utilization with more rapid acceleration and better and more reliable overall performance than can be obtained with either steam or Diesel-electric. Length and weight per horsepower of the locomotive itself are less than for any other type of modern motive power used and cost approximates that of the modern reciprocating steam for equivalent continuous output rating.

Maintenance outlays are lower and, because less labor is required, future costs should not expand as rapidly as for the other forms of motive power owing to further possible increases in unit labor and material rates and prices. Charges for power should not increase in the future to the same extent as those derived directly from either coal or fuel oil, and rates may become less due to bettered efficiency in generation more than offsetting possible growth in other related expenses.

Because it is a converter of energy and not a prime mover, output is not appreciably affected by mechanical condition nor by manual handling. Running times may more readily be maintained because of the surplus power normally available, which, in turn, provides ability to handle heavier trains and a greater volume of traffic than can be done with locomotives whose outputs are confined to the capacities of their self-contained power plants. Faster acceleration reduces traffic congestion more quickly.

The possibility of the electric power supply causing delay and engine failures on the road is relatively remote, due to the size and capacity of transmission lines and the arrangement of substations and feeders used.

Among the disadvantages of electric motive power are inflexibility and the higher first cost and fixed charges for plant and equipment necessary to generate and deliver this form of energy to the locomotive. With steam or Diesel-electric operation, it is practicable to make use of alternate routes for detouring trains, while the electric is confined to its own tracks, but because of the limited number of occasions that such detouring has been necessary, this is not considered very serious.

Although restrictions in the use of coal-burning steam imposed by municipalities have in some cases resulted in the establishment of electric operation for relatively short distances, which, for the most part, are uneconomical, first cost and resulting fixed charges are the limiting factors for any contemplated electrification of consequence and, unless the density of traffic or other conditions such as line topography are such that an overall return on the investment can be obtained, such operation is not justified.

Diesel-Electric Locomotives

To obtain a direct comparison of the performance of Diesel vs. the best available steam power in road freight movements, a comprehensive program of test operations was prepared which provided for typical trains and schedules on various divisions and included the handling of both tonnage and fast freight over some of the heaviest grades on the New York Central System.

Train tonnages were predetermined by the use of actual drawbar pull—speed curves for the classes of power involved and the profiles of the territory, and all locomotives were operated at capacity or as closely thereto as was practicable or required under regular conditions of train movements. Equivalent tonnage and number of cars were used with both types, although differing on the several divisions because of varying characteristics with respect to grades, speeds, train loading, and related conditions.

These tests were carried out in the fall of 1944 and in the spring of 1945 under direct supervision of Equipment Engineering Department representatives, and evaluation of the results revealed, among other basic conclusions, that a three-unit Diesel of 4,500 b.hp.

Table I—Summary of Principal Characteristics of Reciprocating Type Locomotives

Class	K-5	J-1	J-3	L-3	L-4	S-1	S-1	S-1	S-2
Railroad	N. Y. C.	N. Y. C.	N. Y. C.	N. Y. C.	N. Y. C.	N. Y. C.	N. Y. C.	N. Y. C.	N. Y. C.
Type	4-6-2	4-6-4	4-6-4	4-8-2	4-8-2	4-8-4	4-8-4	4-8-4	4-8-4
Service	Pass.	Pass.	Pass.	Frt.	Frt.	Pass. or frt.	Pass. or frt.	Pass. or frt.	Pass. or frt.
Year first built	1924	1927	1937	1940	1942	1945	1945	1945	1946
Year last built	1926	1931	1938	1942	1943	1946	1946	1946	1946
Cylinders, number, diameter, and stroke, in.	2-25x28	2-25x28	2-22½x29	2-25½x30	2-26x30	2-25½x32	2-25½x32	2-25½x32	2-25½x32
Valves:									
Type	Piston	Piston	Piston	Piston	Piston	Piston	Piston	Piston	Poppet
Number and diameter, in.	2-14	2-14	2-14	2-14	2-14	2-14	2-14	2-14	8-6½* 12-6**
Steam pressure, lb. per sq. in.	200	225	275	250	250	275	290	275	275
Driving wheels, diameter, in.	79	79	79	69	72	79	79	75	79
Tractive force, starting, lb.	37,650	42,360	43,440	60,100	59,850	61,570	64,930	64,850	61,570
Weights in working order, lb.:									
On drivers	187,100	190,700	201,500	262,000	265,800	275,000	275,000	275,000	275,000
Total engine	308,000	358,600	360,000	388,500	397,300	471,000	471,000	471,000	485,000
Tender (fully loaded)	282,500	305,600	314,300	374,200	379,700	420,000	420,000	420,000	406,700
Factor of adhesion	4.97	4.50	4.64	4.36	4.44	4.47	4.24	4.24	4.47
Grate area, sq. ft.	67.8	81.5	82.0	75.3	75.3	101.0	101.0	101.0	101.0
Tender capacity:									
Coal, tons	20	28	30	43	42	46	46	46	47
Water, gal.	15,000	14,000	14,000	15,500	15,200	18,000	18,000	18,000	16,000
Maximum cylinder hp. and speed (m.p.h.) at which attained	3,000-54	3,900-66	4,700-77	5,200-72	5,400-76	6,600-85	6,900-85	6,600-77	Not yet determined
Maximum drawbar hp. and speed (m.p.h.) at which attained	2,500-45	3,100-57	3,700-59	4,100-55	4,300-60	5,050-63	5,300-62	5-200-61	Not yet determined
Engine weight, lb.:									Not yet
Per cylinder hp.	103	92	77	75	74	71	68	71	determined
Per drawbar hp.	123	115	97	95	93	93	89	91	Not yet determined
Piston thrust, max., lb.	98,200	110,400	109,300	127,700	132,700	140,000	148,000	140,000	140,000
Effective piston thrust load on main crank pin, lb.	98,200	110,400	109,300	127,700	132,700	70,000	74,000	70,000	70,000
Wheel base, engine and tender, ft.-in.	80-2½	83-7½	83-7½	95-11½	95-11½	97-2½	97-2½	97-2½	97-2½

* Intake. ** Exhaust.

would handle the scheduled symbol main-line trains over our profile equally as well as the four-unit 5,400 b.hp. or the latest modern freight steam locomotive of the same power rating as the latter.

In handling main-line passenger trains, the Diesels have shown a high degree of availability and utilization. For the entire year 1946, the average monthly mileage each for the six double units operated was 29,021. As more locomotives are introduced and their use is extended to trains of lesser importance and shorter runs, the availability and the utilization as expressed in miles per month will, of necessity, decrease somewhat, but it is believed that a considerably greater number can be justified, depending on volume of traffic and character of trains operated.

While the Diesels are definitely established in the motive-power field and possess certain important inherent advantages over modern steam, much still remains to be done if they are to continue to meet successfully competition with other forms of motive power.

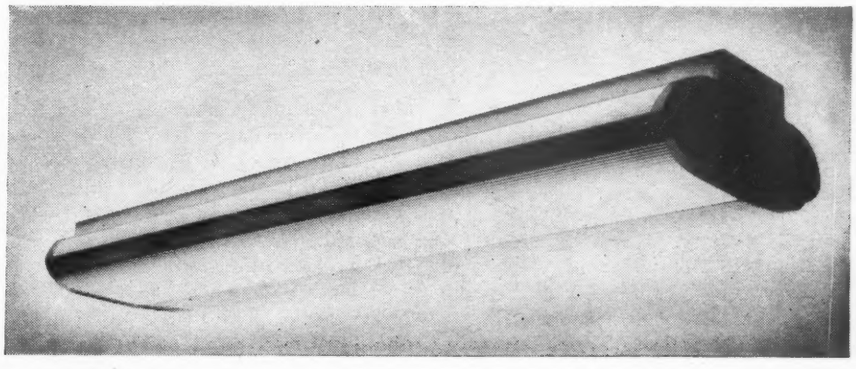
First cost, weight per horsepower, number of units for a given power output, and overall length must be reduced, and improvements made in power plant and transmission, and long-range repair costs must be kept under control.

Future developments may include mechanical or hydraulic transmission, with a saving in weight and cost, more dependable valve and piston construction, additional fuel and water capacity, and progressive decrease in weight, length, and relative cost per horsepower. As higher-speed engines having overload capacity for short periods are designed and used, with accompanying larger generators and motors for an approach to the performance of the straight electric in the handling of trains, care must be taken that the cost of the higher quality fuel which may be required does not offset the savings realized through weight reduction.

(Part II will appear in a later issue.)

Surface-Attached Fluorescent Fixture

A fluorescent lighting fixture for use in office and other commercial applications, which is designed primarily for mounting flush against the ceiling, is now being offered by Holophane Company, 342 Madison avenue, New York 17. It employs two or three horizontally mounted lamps. The light is distributed by a curved type Controlens which collects the light from the lamp and bends it downward in an intensive pattern to provide maximum illumination over the useful areas. This bending action eliminates glare at normal viewing angles. The luminous background for the lighting system is produced by the upper refracting section of the unit which spreads an appreciable amount of illumination across the ceiling. The fixture is 8⅜ in. deep, and is protected against the collection of dirt and dust.



The Holophane surface-attached Holoflux fluorescent lighting unit for office lighting

These fixtures may be installed as single units, or ganged together in extended lengths. They may be suspended on stems where room heights are extreme or where there are obstructions, such as beams or sprinkler pipes.

Modern machinery helps speed the handling of a record volume of railway supplies at storehouses

Five Months' Buying Exceeds $1 Billion

May railway spending shows a slight increase over April purchases and raises total expenditures for materials, supplies and equipment to $1,067,522,900—Inventories reach 24-yr. high

THE Class I railroads made expenditures of $208,606,000 during May and $1,067,522,900 during the first five months of 1947 for materials, supplies, equipment and fuel, according to estimates prepared by *Railway Age,* based on reports received from a majority of the carriers. The May total includes $161,260,000 spent for materials, supplies and fuel, and $47,346,000 of equipment orders placed with manufacturers. Of the equipment ordered, 96 Diesel-electric locomotives at an estimated cost of $14,625,000, 7,390 freight cars totaling $28,821,000, and 39 passenger cars at $3,900,000, comprise the total.

May equipment orders were up $5,738,100 over April's total of $41,607,900. The aggregate of orders during the first five months of 1947 was $270,741,900. Of this amount orders for 216 Diesel-electric, 1 gas-turbine, 4 electric and 10 steam locomotives totaled $51,775,000, while passenger car orders were for 112 cars at an estimated cost of $14,425,000, and 51,934 freight cars were ordered at an estimated cost of $204,541,900.

Purchases of materials, supplies, and fuel for May amounted to $161,260,000, a decrease of more than 3 per cent from the April total of $166,675,000, but exceeded February buying by almost 10 per cent. Furthermore, May buying of fuel, materials and supplies was up 43 per cent from May, 1946's $112,171,000 spent for the same classes of commodities, and represented an increase of 23 per cent over May, 1945, spending for like items.

The aggregate of Class I railroad spending for materials, supplies and fuel for the first five months of 1947 was $796,781,000. This figure represents an increase of 34 per cent in expenditures for the same classes of supplies during the first five months of 1946, and is up 25 per cent over the $637,042,000 spent during the months of January-May, 1945, for similar supplies.

For all materials and supplies (less fuel) the Class I roads spent $109,699,000 in May of this year, a decrease of 5 per cent from April purchases. However, May purchases of these materials ranged from 5 to 19 per cent higher than purchases of similar supplies during the first three months of 1947. Also, May, 1947, buying of materials and supplies was up almost 34 per cent above purchasing in the same month of 1946, and about 35 per cent higher than May, 1945, buying.

Total railroad spending for materials and supplies (less fuel) for the first five months of 1947 was $523,185,000.

1947 Railway Purchases

May's purchases of $208,606,000 swelled the total volume of railway buying for the first five months of 1947 to $1,067,522,900, representing an expenditure of over $213,000,000 a month for materials, supplies and equipment.

	May, 1947	Cumulative Total, 1947
Equipment*	$47,346,000	$270,741,900
Rails	7,085,000	35,701,000
Crossties	8,148,000	38,780,000
All other material	94,466,000	448,704,000
Total from manufacturers	$157,045,000	$793,926,900
Fuel	51,561,000	273,596,000
Grand total	$208,606,000	$1,067,522,900

* Amount placed on order.

an increase of 37 per cent over expenditures for the same classes of supplies during the like period in 1946, and almost 30 per cent greater than the $403,090,000 spent for similar supplies in January-May, 1945.

Purchases of storehouse stocks, exclusive of ties, rail and fuel, also showed a decrease from April to May, with purchases at a level of $94,466,000—a slump of 5 per cent from April buying. However, May, 1947, purchases were 37 per cent greater than those in May, 1946, and ranged from 28 to 71 per cent above railroad buying of storehouse stocks in any May during the years 1941-1945.

Rail and Ties

Total purchases of miscellaneous materials for the first five months of 1947 reflected a steady upward trend which has characterized railroad buying this year. In spending $448,704,000 for this class of supplies during the January-May period, railroads were buying 38 per cent more than in the same months last year, almost 69 per cent more than in the like period of 1943, and 74 per cent more than in the first five months of 1941.

May purchases of rail continued high, reaching $7,085,000, an increase of almost 4 per cent over April of this year, and only 9 per cent lower than the January purchases of $7,809,000, which represent the present high-water mark for 1947. May, 1947, rail purchases also exceeded those of any corresponding month since 1941 by 14 per cent or more.

In keeping with this trend, total rail purchases for the first five months of 1947 amounted to $35,701,000, an increase of 75 per cent over the corresponding period of 1946, and represented buying 43 per cent above that of the like period in 1941, the last year before the full impact of the war was felt.

Crosstie buying for May dropped to $8,148,000, a decline of 8 per cent from April purchases, the year's high, but was 3 per cent above the buying of March, 1947, 3 per cent higher than in May, 1946, and more than 88 per cent above the corresponding month in 1941.

Despite this drop in May crosstie purchases, *Railway Age* figures show that buying roads bought $38,780,000 worth of crossties in the first five months of 1947, an increase of 9 per cent over the same period in 1946, and 35 per cent above purchases for the January-May period of 1945.

Fuel purchases during May amounted to $51,561,000, an increase of less than 1 per cent over the April expenditures of $51,486,000 for the same item. May fuel buying ranged from 6 to 10 per cent lower than expenditures for coal and oil during the months of January, February and March of this year. However, May's fuel purchases showed an increase of 70 per cent over the $30,280,000 spent for fuel in May of 1946.

While fuel purchases during May showed no appreciable gain over April buying, total expenditures for fuel during the five-month period, January-May, 1947, were $273,596,000—27 per cent greater than the $214,151,000 spent for fuel during the same period of 1946. From January-May, 1945, the Class I roads spent $233,952,000, or 17 per cent less than their expenditures for fuel in the like period in 1947.

Stocks of materials, supplies, and fuel on hand May 1, 1947, totaled $720,591,000 for the Class I railroads according to reports of the Interstate Commerce Commission. This total shows a gain of 1.5 per cent over inventories of April 1, 1947, reaching a new high for monthly inventories over the last 24 years. May 1 stocks were 18 per cent greater than those of May, 1946, almost 18 per cent above May, 1945, 95 per cent over those of the corresponding month of 1941, and represented an increase of 140 per cent over inventories as of May 1, 1936.

Railway Age estimates for May 1, 1947, show miscellaneous materials and supplies (excluding fuel, rail and crossties) on hand valued at $535,071,000. This total is up 2 per cent over inventories of similar materials on April 1, 1947, and shows increases of 12 per cent over the stock on hand January 1 of the current year and of 18 per cent over stores stocks of May 1, 1946. May 1, 1947, stores stocks represent an increase of 132 per cent over amounts on hand on May 1, of the depression year 1937.

Crosstie inventories May 1 of this year represent an investment of $89,906,000—a decrease of 8 per cent over April 1 stocks, but an increase of 7 per cent over inventories of January 1, 1947. May inventories also were 16 per cent larger than the $77,413,000 tie inventory of May 1, 1946, and were 20 per cent above stocks on May 1, 1945.

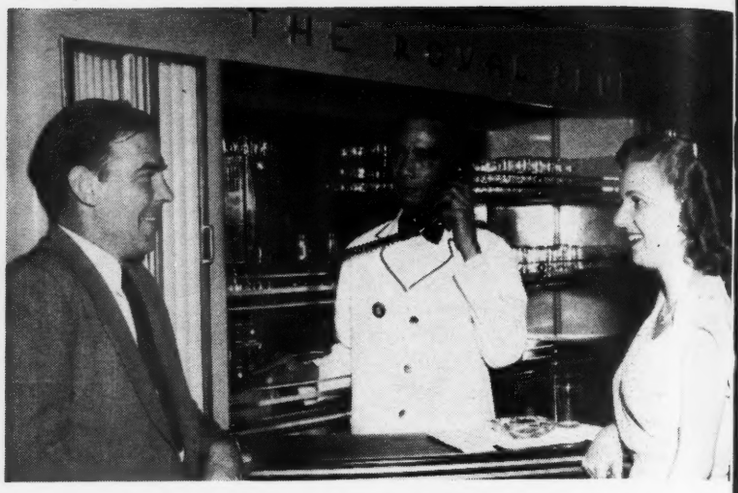
Rail on hand dropped 10 per cent from April 1, reaching a new low of $26,875,000 for this year. However, dollar value of rail stocks for May 1, 1947, was up 11 per cent from the corresponding date in 1946, and up 3 per cent from May 1, 1945's $26,057,000.

Scrap stocks on hand as of May 1 were 13.7 per cent higher than April's, reaching the total of $12,766,000. Nevertheless, May's scrap inventories were 25 per cent below March's $17,017,000, the high for any month since 1938, but were 16 per cent above scrap on hand in May of 1946, and 22 per cent higher than May, 1945's $10,414,000 stock.

Value of fuel stocks on May 1 amounted to $55,973,000, a rise of 9 per cent over April's fuel on hand, and 7 to 12 per cent above inventories for the first three months of the present year. May's fuel inventories also were 30 per cent above those of May 1, 1946, but only 9 per cent higher than the $51,236,000 inventory of May 1, 1945.

This old station porter at Berchtesgaden, Germany, recalls the Fuehrer's pomp

Transmitter equipment in the Pennsylvania lounge car



Above—The attendant in the lounge of the B. & O.'s "Royal Blue" places a call for one of the passengers. Below—W. R. Triem, superintendent of telegraph of the Pennsylvania, making the first call from the "Congressional"

Two Roads Install New Radio-Telephone Service

A "TRAIN-TO-TRAIN" conversation between A. S. Hunt, chief engineer of communications and signals of the Baltimore & Ohio, and W. R. Triem, general superintendent of telegraph of the Pennsylvania, inaugurated a special press demonstration August 14 in which the two roads collaborated to show how passengers may telephone from a moving train to another train or virtually any other domestic or foreign telephone subscriber. Mr. Hunt spoke from a B. & O. train en route from Washington, D. C., to Philadelphia, Pa., to Mr. Triem on a P. R. R. train en route from New York to Washington.

The conversation was transmitted part of the way by radio and part by land telephone lines as the two trains sped toward one another at speeds up to 80 m.p.h. Representatives of the press also were given the opportunity to talk directly with their home offices from the trains.

The new telephone service became available on an experimental basis for public use August 15 on the B. & O.'s "Royal Blue" and the Pennsylvania's "Congressional Limited" between Washington and New York and on August 22 on the Pennsylvania's "Potomac" from Washington to New York, and the "Legislator" from New York to Washington. A section of the lounge car on each train has been set apart to afford privacy to passengers using the service. Railroad attendants are on duty to assist in placing calls and to page passengers who are being called.

The train radio-telephone equipment was designed especially by the Bell Telephone Laboratories. The telephone handset used by passengers is like that of an ordinary telephone and is used in exactly the same way. Along the Washington-New York route, telephone communication with a moving train is made through the nearest of the Bell System land radio-telephone stations, located at Washington, Baltimore, Md., Philadelphia, and Newark, N. J. Each of these stations is connected with the wire telephone network.

Calls can be made either to or from the trains, connecting passengers with any one of more than 52,000,000 telephones throughout the world. To telephone from the train, the caller merely lifts the handset and gives the desired number to the mobile service operator when she answers. She then extends the call over regular telephone facilities to the designated number and the passenger begins the conversation.

Anyone wishing to call the train from a stationary telephone contacts long distance and gives that operator the name of the person wanted and the name of the train on which he is traveling. The long distance operator then relays the call by wire to the mobile service operator at the proper city. From there, the call is completed to the train by radio.

The train telephone service costs the same as other mobile telephone service. Calls between a train and a wire telephone within the "mobile service area" through which contact is made—roughly including exchanges within a radius of 20 to 25 miles from the land radio sta-

tion—cost 30, 35 or 40 cents each for the first three minutes, depending on the location of the stationary telephone. A call between a train and a telephone beyond that area would cost the same as a daytime person-to-person call between the area and the distant telephone. For example, a call between a train in the Newark, N. J., area, and Chicago would cost the same as a call from Newark, or $2.10 for the first three minutes. A call between a train at or near Baltimore and Cincinnati, Ohio, would cost $1.65 for the same period.

While designed primarily for public use, the train telephone system also will be available to the train crew should the occasion arise.

Builds New Bridge

(*Continued from page 40*)

who were standing on Pier 14 when the closing was effected.

After the track had been extended over the truss span the derrick car was brought up and used to dismantle the traveler crane. The remaining 120-ft. span was assembled by the derrick car on April 3. After riveting this span and placing a temporary track over it, the six remaining spans, which had been shipped completely riveted up, were placed by this car. The 95-ft. spans weigh about 67 tons each, with shoes attached. Four of these were placed in one day, which is a notable record for one piece of equipment in erection work of this character. After the placing of the last span in the west approach the derrick car was returned to Spans 4 and 5, which were shifted into final position on April 17, whereupon the new bridge was opened to traffic, a period of 4 months and 10 days having elapsed since the placing of the steelwork in Bridge 1728. The fabrication and erection of the steelwork, including the remodelling of the two second-hand spans mentioned, were performed under contract by the American Bridge Company.

Steel Fire Stops Used

Both of the new bridges have open treated timber decks of a construction that is standard on this railroad. An innovation, so far as the B. & O. is concerned, is the use of steel fire stops, each about 20 track-feet in length, placed at the center and at each end of the truss span, and at intervals of about 400 ft. in the approach viaducts. These stops consist of steel ties to which the rails are bolted, with fibre pads between the rails and the steel ties and between the ties and the girders to minimize impact.

The American Bridge Company's contract included the removal of the old superstructure, and this was accomplished by lowering the suspended span to barges and removing the cantilever arms by derrick boat. The 240-ft. anchor arms were thrown to the ground and separated by torch to permit removal.

In conjunction with the work on the Kanawha River bridge, and with the intention of opening the territory between that bridge and Kenova to E-55 loading, 17 smaller bridges, including several timber trestles and three steel structures, were strengthened or partially rebuilt. In these three steel structures, seven second-hand girder spans, remodeled in the railroad company's shops at Martinsburg, W. Va., were used. All of these spans were erected by the American Bridge Company as an extension of its work on the Kanawha River bridge. The largest of these bridges was that known as 2207, at Ceredo, W. Va., in which four of the seven spans mentioned were placed.

The amount appropriated for the replacement of the Kanawha River bridge was $1,890,000, and that for the work on the 17 smaller bridges $221,400. Although the work was carried out in a period of rising prices, the actual cost has been well within the appropriation.

The entire project was carried out under the supervision of the engineering department of the railroad, of which A. C. Clarke is chief engineer. All design plans of the substructure and superstructure were prepared in the writer's office, in which G. H. Dayett is assistant engineer of bridges, A. Clark, designing engineer, Milton Jarrell, chief draftsman, and A. J. Wegmann, chief bridge inspector (erection). Field work was under the direction of Regional Engineer W. W. Gwathmey, Jr., later promoted to engineer of construction and succeeded as regional engineer by Joseph W. Jones. Field Engineer Robert D. Bewick was stationed at the site during the entire period of construction, and the field work was under his immediate supervision.

For the John F. Casey Company, Hood Doll was superintendent during construction of the substructure and the general grading work. That company designed the cofferdams, submitting plans for checking to the engineer of bridges.

For the American Bridge Company the field work was under the direction of John Lowery, manager of erection, W. O. Weathersby, superintendent of erection, J. M. Scott, field engineer, and Dave Sutphin, superintendent. That company, in addition to an excellent job of fabrication, prepared elaborate calculations of the increased strains and deflections resulting from the cantilever method of erection and from the position of the erection equipment during the lifts. As one result of these investigations, it was found necessary to enlarge some sections of the members to take care of these increases, but the additional weight amounted to less than ½ per cent.

The bridge and the territory were formally opened to traffic and increased power on May 10, 1947, in a colorful local ceremony.

* * *

Photo by Signal Corps—U. S. Army

The Army's New Railway Transportation Office in Tokyo

Constructed amidst the rubble and bamboo props that hold the remains of the bomb-damaged station in place, this room forms part of the accommodations for occupation forces using the Japanese railways.

GENERAL NEWS

More Roads Ask for Signal Order Relief

Commission gets many requests for exemptions from its requirements

The Interstate Commerce Commission this week received additional railroad petitions calling for the modification of its June 17 order in the Docket No. 29543 proceedng, wherein it required the railroads to install automatic train-stop or train-control systems, cab signal systems, or automatic block signals on lines over which high speed trains are run. Other applications have been reported in these pages in recent weeks.

The Illinois Central seeks commission authority to operate certain passenger trains with its present automatic block signal system at speeds of 80 m.p.h. or more, where permitted, between Chicago and New Orleans, La., and between Gilman, Ill. and Mont. Asserting that the signal protection in those territories is adequate for safe operation at permitted speeds, the I.C. said that except for its line between Champaign, Ill., and Branch Junction, 124 miles, where automatic train control and cab signal protection is provided, it has during the past few years replaced all semaphore type signals with automatic block signals of the color light type. It said that the cost of installing additional protection in the territories involved would amount to approximately $2,100,000. According to the petition, only five trains are operated at speeds to come under the commission's order.

The Great Northern wants the order modified so as to permit the operation of its "Empire Builder" at a speed not exceeding 85 m.p.h. over those portions of its line between Long Lake, Minn., and Breckenridge, 182.9 miles; Nolan, N. D. and Minot, 189.5 miles; and Lyons, Wash., and Canby, 25.5 miles. All other G.N. passenger trains move over those segments, which are protected by automatic block signals, at a maximum speed of 65 m.p.h. The G.N. estimated that the cost of installing an automatic cab signal system in the territories involved would amount to $2,176,950.

A Texas Problem—The Texas & Pacific seeks relief from that portion of the order requiring the installation of an automatic block signal system or manual block system over lines where passenger trains are operated at 60 m.p.h. or more and freight trains at 50 m.p.h. or more. The order affects 112.5 miles of line between Texmo Junction, La., and Lucas, where the road estimates it would cost $791,000 to install an automatic block signal system.

The T. & P. also objects to installing train-stop or train-control systems or cab signals on those parts of its line, now protected by an automatic block signal system, where it operates passenger trains at speeds of 80 m.p.h. or more. Estimating that such a project would require an expenditure from $1,268,400 to $2,455,500, the T. & P. said that if it is required to install automatic cab signals, such installments should be made solely within the cabs of those locomotives to be operated at a speed in excess of 79 m.p.h.

The Nashville, Chattanooga & St Louis, which has spent $1,691,000 for centralized traffic control installations since 1942, has asked the commission to exempt its single line main track between Bruceton, Tenn., and Aulon, 138.1 miles, from that part of the order requiring the installation of automatic block signal or manual block protection over segments where passenger trains are operated at 60 m.p.h. or more and freight trains at 50 m.p.h. or more. The road said that the Bruceton-Aulon line is now operated under a timetable and train order system, but that its volume of traffic does not justify the installation of block signals.

The Chicago, Burlington & Quincy has requested relief from the requirement that it install train-stop or train-control or cab signals on those portions of its line between Lincoln, Neb., and Denver, Col.; Ashland, Neb., and Lincoln; Red Oak, Iowa, and Pacific Junction; Pacific Junction and Council Bluffs; and North La-Crosse, Wisc., and St. Paul, Minn., which are protected by automatic block or manual block signals and over which the Burlington operates its passenger trains at 80 m.p.h. or more.

Six Million on the "Q"—Noting that the cost of installing additional protective devices would range from $877,055 to $6,430,160, and that all but 6.03 miles of its Lincoln-Denver line is protected by a C.T.C., while the 6.03-mile segment is operated under a manual block system, the

(*Continued on page 56*)

Announce Diesel Price Rise for October

An increase of six per cent in the prices of all Diesel-electric locomotives has been announced by the Baldwin Locomotive Works and the Electro-Motive Division of the General Motors Corporation. Baldwin's increase will go into effect about the middle of October, it was stated, and the Electro-Motive increase will become effective for all locomotives delivered after October 10.

"Freedom Train" Set for Nationwide Tour

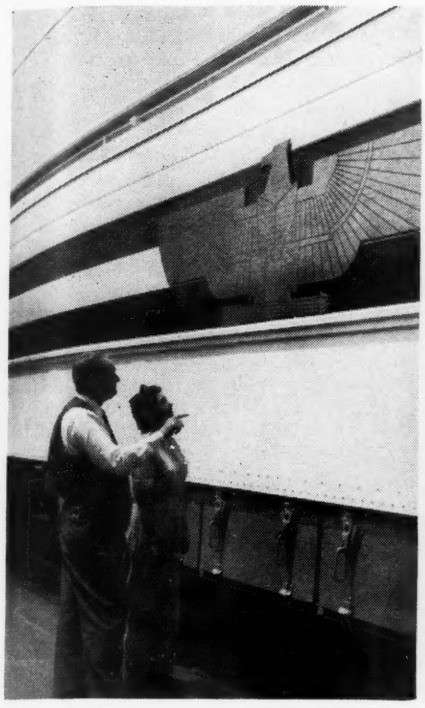
Unit displaying historic documents to start from Philadelphia September 17

What is described as the longest train tour in American railroad history will begin September 17 when the American Heritage Foundation's "Freedom Train" leaves Philadelphia, Pa., on a 33,000-mile, year-long trip around the country. The trip represents a cooperative plan on the part of the 52 railroads, which have contributed the various component parts of the train and worked out intricate routing that is necessary.

The train, operated at all times as a "special," will carry more than 100 of the nation's most priceless historic documents, including the Bill of Rights, the Declaration of Independence and an early draft of the United States Constitution. The purpose of the tour is to inspire in Americans a greater awareness of the principles that gave the United States its freedom and independence, and to stimulate a more active participation in national, state and local government and community life to protect these liberties.

Diesel-Powered—The exhibition cars for the display have been contributed by the Pennsylvania. Three "domicile" cars, especially converted to meet the needs of the train's permanent personnel, have been loaned by the Pullman Company, while the equipment car has been donated by the Atchison, Topeka & Santa Fe. The equipment car will carry a special electric power plant, capable of generating both 32 and 110 volts, in order to meet the varying electric power needs of the train during the trip. A telephonic communication system will connect all parts of the train, which will be pulled by a 2,000-hp. Diesel-electric locomotive, donated for the tour by the American Locomotive Company and the General Electric Company.

The design for the train, which is outfitted with elaborate security measures to insure the safekeeping of the irreplacable documents, was worked out by Edward A. Burdick Associates, and actual construction was done by the Pennsylvania under the direction of Stanley G. Somers, director of the exhibits for the War Department. The basic precautionary feature is the all-steel construction of the train itself. The exhibit cars had to be gutted, sand-blasted and completely repainted, as well as having new wall sections installed. Trucks of each car were overhauled and new wheels and brake rigging added. Car axles were magnafluxed. Some 20 tons of steel were welded into the cars during the job.



Left—Exterior treatment of a standard Pennsylvania coach in the "Freedom Train." Below—Interior of a car showing the aisle arrangement and the wall recesses into which the documents will be inserted

Electrical wiring for the train is either BX cable or rigid conduit, and conforms to the standards of the National Bureau of Underwriters. While all interior furnishings are of fire resistant materials, a special fire-extinguishing system, employing carbon dioxide, was custom built and installed in the three exhibit cars. This system is entirely automatic and is activated by means of a temperature-pressure device.

Further protection of the documents has been secured by the extensive usage of a new type of lucite plastic. Between three and four thousand square feet of this plastic was manufactured especially to meet the train's requirements as specified by the National Archives and the Library of Congress. Such papers as the Bill of Rights are exhibited between plastic sheets, which, in turn, are anchored inside steel boxes by star-headed bronze bolts. These boxes are covered with shatter-proof double glass sheets fastened to walls with screws. Each plastic "envelope" housing a document measures half an inch in thickness. The plastic is also fire resistant, water resistant and shatter proof.

Short, Slow Runs—The train's running schedule has been planned so that high speeds will be unnecessary. All jumps will be short and none longer than overnight. Tentative routing of the train, as presented to the railroads, was determined by Walter H. S. O'Brien and Alfred E. Rowe of the foundation. All states and as many cities and towns as possible in each state will be covered allowing for an exhibition time of from 10 a.m. to 10 p.m. each day, with one day of rest out of each seven for the train crew.

The makeup of the train crew is on a cooperative basis. The government has assigned 24 U.S. Marines to maintain a day and night security guard and a government archivist will accompany the train to oversee all matters pertaining to the care and preservation of the documents. The Pullman Company has supplied three porters, while the Pennsylvania, General Electric and the American Locomotive Company have pledged the services of seven maintenance men.

Regular monthly locomotive check-ups by federal inspectors are provided for in the train's itinerary, the train being scheduled into localities where federal inspectors are located when the time comes for examinations.

All railroads handling the train are charging less than the tariffs require, as it must be handled under contract similar in principle to the handling of circus and carnival trains. Most of the participating railroads are handling their liaison with the train through the Assocation of American Railroads and it is expected that at least 5,000 railroad men will have contributed their services to the train by the end of its tour.

The tour is sponsored by the United States Department of Justice and is financed by the Foundation, a non-profit, non-political citizens' organization representing business, labor, industry and various community, religious and educational bodies.

New Diesel Shop in Mexico

The construction of a special workshop in San Luis Potosi for the repair and maintenance of Diesel-electric locomotives is planned by the National Railways of Mexico, according to a recent issue of Foreign Commerce Weekly, a publication of the United States Department of Commerce. The project is scheduled for completion before the end of 1947 and will represent an investment of about 1,000,000 pesos, of which 700,000 pesos will be for the shop itself and 300,000 pesos will be for the necessary equipment. Firms interested in supplying equipment are advised to contact Sr. Rudolfo Flores, purchasing agent for the railway, Bolivar 19, Mexico, D. F.

Pennsylvania Announces New L.C.L. Loading Device

A new development in freight car equipment—load-securing devices which permit more efficient loading of l. c. l. freight and increase the protection against damage en route—has been announced by the Pennsylvania. The new devices, used in larger than standard box cars, are reported to enable the road to increase the average loading of merchandise freight by as much as 133 per cent. Four hundred of 2,100 box cars now being constructed at the road's Altoona, Pa., shops, will be assigned to merchandise service and equipped with the devices.

Steel gates with upper and lower sections are fastened to the sides of the car approximately six feet apart. When closed they lock together to form bulkheads across the car from the floor to near the ceiling. Sectional steel and wood shelves are hinged to the tops of each of the lower gates. When the gates are locked in position after the section is loaded, the shelves are swung up and made to rest on the tops of the adjacent gates, forming a second floor or deck between the floor and the ceiling. When the gates and shelves are in use in a loaded car they have the effect of dividing the car into small compartments. Freight piled in the upper compartments rests on the shelves so that it cannot damage freight resting on the floor. The gates keep the freight firmly in position and prevent shifting while the car is in motion. When a car is unloaded, the devices may be swung to the side of the car and locked into position, permitting the car to be used for general service.

"Merchandise freight is frequently bulky, but not heavy, so that the box cars carrying it cannot be loaded as heavily as coal cars, for example," a Pennsylvania spokesman said. "One hundred of the new cars equipped with the loading devices will be

60 feet long, or one-third longer than standard, enabling us to more than double the average loading. The 300 others will be 50 feet long . . . and will also reflect substantial gains in loading capacity."

Railroads Predict Financial Chaos Unless Rates Go Up

Although the railroads currently are handling a record-breaking volume of peacetime traffic, a number of the larger roads are operating at a loss and earnings for the industry as a whole are "far below" what they should be if the carriers are to avoid "financial disaster" and are to continue making the necessary improvements to their plant and services to the public.

This statement was included in memoranda of testimony filed this week by the railroads with the Interstate Commerce Commission and which will be presented at hearings before the commission next month in Ex Parte No. 166, wherein the carriers seek freight rate increases calculated to yield $1 billion in additional annual revenues. The memoranda stated that the proposed tariffs would raise the freight rates for the country as a whole by "about 17 per cent," or slightly more than was estimated in the petition filed by the carriers last month, as outlined in *Railway Age* of July 12, page 85.

The railroads told the commission that, based on present rates and the estimated decline in traffic, freight revenue in 1948 will be about $175 million less than in 1947 and passenger revenues will drop approximately $100 million. Based on conditions existing at the time the petition was filed, the net income next year will be nearly 50 per cent less than it is expected to be in 1947, they said.

Since 1939, the memoranda stated, railroad freight rates have increased only 17 per cent, while railroad wage rates have increased 52 per cent the average price of railroad material has gone up 67 per cent and the rate of payroll taxes has risen 52 per cent. It added that since the petition for higher freight rates was filed, the average price of railroad material has already increased an additional 8 per cent, and that even with the rate increases granted since 1939, the revenue received by the railroads for hauling a ton of freight one mile averages only slightly more than one cent.

Asserting that the railroads are continuing and should continue expenditures in the public interest for additions and betterments to their property, the memoranda noted that as of July 1, the carriers had on order new equipment that will call for a capital investment of close to $1 billion. Unless the railroads are allowed increased freight rates, the memoranda continued, their average rate of return on investment in 1948 will be less than 2½ per cent. This "wholly inadequate" rate of return compares with an anticipated 3¼ per cent in 1947 and 2¾ per cent in 1946, and is the lowest since 1939. The 1948 return, based on wages and prices as of June 30, 1947, reflects conditions prevailing at the time the railroads' application for increased rates was filed and does not take into account the substantial increases in costs of fuel, material and supplies which have occurred since then, nor any higher wage costs which may develop, the memoranda said.

A rate of return of only 2½ per cent, the railroads contended, is not only injurious to the railroad industry and the national economy but is 60 per cent less than what the Supreme Court of the United States has repeatedly held to be a fair and reasonable rate of return for regulated utilities.

The railroads also told the commission that they are effecting economies through more efficient operation and in other ways. For example, they said, freight car-miles per car-day have increased 32 per cent since 1939 and net ton-miles per serviceable freight car-day went up 70 per cent. Locomotive performance has also improved, they added, the daily mileage of freight locomotives at present being 15 per cent more than it was in 1939 and the daily mileage of passenger locomotives almost 18 per cent.

Gondolas with Nailable Steel Flooring on Exhibit

Two gondola cars with nailable steel flooring were placed on exhibition by the Great Lakes Steel Corporation at the North Western station in Chicago on August 18. These cars were described in *Railway Age* of June 23 (daily edition), page 62.

The new type flooring, which may be used either in open-top cars or box cars, and which the builder claims will last the life of the car, has the effect, due to the increased holding strength of nails driven into it, of cutting down damage to lading. It is particularly advantageous in times of car shortages not only because it eliminates the time cars are required to be out of service for floor renewals, but because it will permit shippers, in many instances, to use inbound steel-floored cars for outbound shipments which must be braced and blocked by the use of nailing.

The manufacturer reports that 10 different roads have already made plans to install the new type flooring in about 300 cars during the last quarter of 1947.

Water Carriers Seek Same Rate Increase as RRs

Coastwise steamship lines operating to and from ports on the Atlantic and Gulf of Mexico coasts, have joined in support of the freight rate increases proposed by the railroads in Ex Parte 166, which, among other things, seek authority to increase rail-ocean, ocean-rail and rail-ocean-rail rates. The water carriers have petitioned the commission for authority to increase, without commodity exceptions, their port-to-port rates and charges and joint through rates in which they participate with the rail, water, barge and motor carriers. They also request authority to make corresponding increases in their local, joint and proportional all-water rates and charges and in the joint truck-water, water-truck and truck-water-truck rates.

The commission also has received a petition from the Inland Waterway Corporation, operator of the Federal Barge Line, for authority to increase its joint rail and water rates and its local, proportional and joint all-water rates and charges to the same extent as may be authorized in connection with the railroads' proposed all-rail and joint barge-rail rates and charges. The I. W. C. also expressed its opposition to the so-called combination rule and to the railroads' proposal that flat increases in cents per ton on coal accrue entirely to those carriers.

Another water carrier, the American Barge Line, seeks authority to increase by the same percentage as may be authorized the railroads its carload and less-than-carload port-to-port rates in addition to its joint rates with other common carriers.

O.D.T. Lifts Embargo on Coal Shipments to C.N. Points

Return to this country by the Canadian National of a "substantial number" of United States-owned freight cars resulted this week in the lifting by the Office of Defense Transportation of an embargo placed August 14 on coal shipments to Canada via the C. N. R. Placement of the embargo, which did not apply to the Canadian Pacific, was responsible for a vigorous protest submitted to the State Department by the Canadian government.

As reported in *Railway Age* of July 16, page 69, the embargo was to have remained in effect until such time when there would be not more than 8,000 more U. S.-owned freight cars in Canada than Canadian-owned cars in this country. It had been asserted that the C. N. was using the U. S.-owned cars for shipments within Canada instead of returning them to this country when made empty.

Intimating that the embargo had served its purpose, a spokesman for the O. D. T. said that the C. N. now has on its lines 8,654 more U. S.-owned cars than there are Canadian-owned cars on domestic roads. This figure compares with 18,000 about seven weeks ago.

Escalators at Kansas City

Eight Otis escalators will be in operation this September between the train-side platforms and the main floor of the Kansas City (Mo.) Union Station, it has been announced. Costing $600,000, the escalators will each carry 8,000 persons per hour and eliminate need for the use of stairways by passengers in moving to or from trains or transferring from one train to another.

C. A. B. Institutes Investigation of Reduced Air Freight Rates

Although it denied petitions filed by the Air Freight Forwarders Association, among others, to suspend the new tariffs, the Civil Aeronautics Board has instituted an investigation into the lawfulness of its recently-approved 25 per cent reduction in air-freight rates for 19 scheduled air lines.

Allen Dean, president of the air forwarders, declared that the air lines, operating with half-empty cargoes and their losses made up by the federal air mail subsidy, have denied themselves the services of the independent air freight forwarders. Mr. Dean said that the new rates do not provide for a volume break, particularly at

the level of the DC-3 plane, which, he said, performs about two-thirds of the cargo work for the airlines.

At the same time, he also charged that the scheduled air lines, through the Air Transport Association, have undertaken a "blitz campaign" against the independent air freight forwarders and operators to "stifle all competition."

Lima-General Machinery Merger Planned; to Build Diesels

A plan to combine the activities of the Lima Locomotive Works, Lima, Ohio, and the General Machinery Corporation, Hamilton, Ohio, has been approved by the boards of directors of both companies and will be submitted to the stockholders of each company for approval at special meetings on October 1, it has been announced. If the plan is made effective, the new firm will be known as the Lima-Hamilton Corporation.

Lima has not heretofore built Diesel-electric locomotives, but it is contemplated, the announcement said, that once the plan is approved by the stockholders immediate steps will be taken to begin the manufacture of such engines, based on General Machinery's experience with Diesel power. For the past three or four years, the announcement added, General Machinery has been developing a free-piston gas generator turbine which, as a prime mover, has application to locomotives, ships and stationary power plants.

The proposed plan provides for changing Lima's present capitalization of 211,057 shares into 1,134,431 new shares of $5 par value capital stock through the issuance of 5⅜ shares for each share outstanding and the issuance by Lima of 805,952 additional shares of new stock to General Machinery for all the latter's assets. All contracts and liabilities of General Machinery will be assumed by Lima. General Machinery, which will distrbute to its own stockholders, on a share-for-share basis, the Lima shares received, will be dissolved. It is contemplated, the announcement concluded, that Samuel G. Allen, chairman of Lima's board, will be chairman of the new company, and that George A. Rentschler, General Machinery chairman, will become chairman of the new firm's executive committee. John E. Dixon, president of Lima, will be president of the new firm.

P. R. R. Amplifies Employee Suggestion Program

An amplified program to encourage suggestions from employees for better ways of doing things and for improving service to the public has been inaugurated by the Pennsylvania. Known as the "Employees' Suggestion Plan," the program is an enlargement of the road's "Bureau of New Ideas," which has channeled to the management more than 17,200 suggestions from employees in 281 job classifications in every department and division. Approximately 4,600 suggestions, or 26.8 per cent of the total, have been adopted and placed in effect. So far this year, more than 36 per cent of all suggestions have been adopted.

Increased cash awards for suggestions adopted, as determined by their value and importance, are a major feature of the new program. Suggestions having to do with improved passenger and freight service, the efficient operation of the railroad, maintenance of all types of equipment, mechanical improvements, simplification of records and documents, and all other phases of work on the road are eligible for consideration. Employees are invited to send their suggestions to Suggestion Plan headquarters at Philadelphia, Pa., where they will be referred to the proper officials for confidential consideration and without disclosing the identity of the authors. All employees sending in suggestions will be advised, at their homes, as to the outcome. Senders of suggestions not found acceptable will be told the reasons for rejection.

"Rip Van Winkle" Ad Leads to Faricy-Young Debate

William T. Faricy, president of the Association of American Railroads, and Robert R. Young, chairman of the Chesapeake & Ohio, continued this week their public discussion of the freight-train schedules of the railroads. Mr. Faricy on August 20 described as "sheer nonsense" charges made by Mr. Young that great quantities of food are going to waste because of inadequate railroad transportation. Mr. Young's allegations were contained in a statement issued in New York on August 19 and in the nationwide "Rip Van Winkle" newspaper advertisements, described in the *Railway Age* of August 16, page 70.

"Outdoor storage of grain is a common practice in the West and has been since the combine harvester came into general use," Mr. Faricy said. "This has compressed into a few days in each locality the old-time harvest season, which used to occupy many weeks. The waste of outdoor grain storage is negligible.

"The railroads, as a matter of fact, are moving the bumper grain crops in record-breaking volumes, and cars are arriving at many of the major terminals just as fast as they can be unloaded. Grain loadings so far this year have been greater than in any corresponding period on record. They show an increase of 12.8 per cent over loadings of the same period in 1946 and 4.4 per cent over 1945."

This statement by the A. A. R. president was the second he issued in reply to the C. & O. advertisement, and was in rebuttal to Mr. Young's comment on the first Faricy statement, made August 14. At that time he remarked that "Freight train speed wars among the railroads—the remedy for the car shortage proposed by Robert R. Young—would shrink rather than expand the total car supply. If Mr. Young will consult the management of his own railroad, he will discover that the only way the railroads can run their freight trains faster is to reduce the number of cars in each train, and that, of course, would necessitate the running of many additional trains.

"Aside from the extravagance of Mr. Young's proposal, the locomotives to haul the additional trains are non-existent. And in the West particularly, where most of the railroad mileage is single-track, the additional trains would congest the rails and switching yards and defeat their purpose.

"There would be fewer cars available for shippers rather than more.

"Mr. Young completely overlooks the fact that the railroads today are moving the greatest volume of traffic in their peacetime experience. Some even are moving a greater volume of traffic over their lines than at any time during the war.

"However, if Mr. Young thinks he has a good idea, the place for him to try it out is on the Chesapeake & Ohio, which operates unusually heavy tonnage trains at relatively slower speeds. The C. & O.'s record for average freight train speed is nearly one-tenth below the average for all the freight trains in the country. If reducing the tonnage of their trains and running them faster will make more freight cars available to shippers who need them, Mr. Young should do it himself before presuming to sponsor public statements telling other railroad managements how to do it.

"There is no 'deliberate slowdown' in freight train speeds in the West, as charged by Mr. Young. The fact that the important routes between Chicago and California all make approximately the same running time is because of intense competion. The road most favored by physical advantages, such as shortest distance, most favorable grades and curvature, naturally sets the pace. The others, forced by competition to make the same time, do so by cutting down the tonnage of their trains."

This statement led Mr. Young to say on August 18:

"Mr. Faricy has replied to our latest public service advertisement in which we offered a constructive solution to the present box car shortage at a time when there is a bumper crop which must be moved to market. This reply says in plain effect that competition is a bad principle in the railroad business. Mr. Faricy argues that if the roads did not practice deliberate freight slowdowns so that each road has the same time schedule they might have to run shorter trains and more of them. What of it? No road would have to do this unless a competitor found it profitable.

"Mr. Faricy would deplore having what he calls freight 'speed wars' (on trains now averaging 20 miles per hour)—just as a little while ago some of the roads deplored 'quality' wars when they voted to suppress air conditioning. What is wrong with 'quality wars' or 'service wars'? For that matter, isn't that the way all our great American industries were built? It is only by each road trying to serve the public to the best of its own ability that our railroad systems will ever progress.

"Mr. Faricy's crack about the C. & O. is a poor smoke screen because he knows as well as I do that the C. & O. is predominantly a coal-carrying road, that we have no shortage of coal cars, and that there is no problem about the delivery of coal on our road though all roads are short of box cars."

It was this statement to which Mr. Faricy referred on August 20 when he said:

"Mr. Young insists that he offered 'a constructive suggestion' in his self-styled 'public service advertisement,' and I repeat

that if he thinks he has a good idea the place for him to try it out is on his own railroad, which operates unusually heavy tonnage trains at speeds that are slower than the average for all freight trains in the country.

"The C. & O. chairman has his thinking in reverse when he talks about 'deliberate freight slow-downs' in the West. Intense competition, on the contrary, has compelled freight speed-ups. Lines operating between Chicago and the Pacific coast that are less favored by distance, curvature and grades deliberately reduce the tonnage of their trains in order to equal the time made by the heavy-tonnage trains operated by the roads with more favorable physical characteristics.

"Mr. Young falsely asserts in his latest statement that I believe 'competion is a bad principle in the railroad business.' I don't know of any segment of private enterprise in which there is more competion than in the railroad business. It is so highly competitive that Congress has expressly declared against 'destructive competitive practices' lest the railroads go too far—as Mr. Young would have them do—in the direction of wasteful and uneconomical practices to the detriment of the shipping public which pays the bill."

Operating Revenues in July 2.6 Per Cent Above 1946

From preliminary reports of 81 Class I railroads representing 81.1 per cent of total operating revenues, the Association of American Railroads has estimated that the July gross amounted to $560,897,424, an increase of 2.6 per cent above the $546,654,536 reported for the same 1946 month. Estimated July freight revenues were $443,575,126, compared with $414,949,269, an increase of 6.9 per cent, while estimated passenger revenues were $73,831,055, compared with $91,788,656, a decrease of 19.6 per cent. The estimate for all other revenues totaled $43,491,243, compared with $39,916,611, an increase of 9.0 per cent.

More Roads Ask for Signal Order Relief

(*Continued from page 52*)

Burlington contended that no additional signal devices are necessary on its line.

The St. Louis-Southwestern seeks authority to maintain speeds at 60 m.p.h. for passenger trains and 50 m.p.h. for freight trains over that portion of its line between Dexter Junction, Ark., and Pine Bluff Shops, 266.3 miles, without installing an automatic block signal or manual block system. The road said it is willing to install automatic block signals for 35 curves on that segment which are not presently protected. Cost of such installation, it said, would total $268,000, while the installation of similar devices to protect the entire line would amount to over $1 million. The latter expenditure, it contended, would be unwarranted because of light train density and 94.84 per cent of tangent track.

The Colorado & Southern, which seeks exemption from the entire order, told the commission that it cannot possibly fix the speed of its passenger trains below 60 m.p.h. or its freight trains below 50 m.p.h. without substantially adversely affecting its business and without worsening its poor financial position. Only 39.7 miles of the C. & S., between Walsenburg, Col., and Trinidad, is protected by block signals.

According to the C. & S., it has had only 7 collisions in the last 7½ years. It said that the average cost for property damage, wrecking expense and personal injuries, which might have been avoided had block signals been installed, amounted to $5,975, or less than 8 per cent of the estimated annual cost of maintaining and operating an automatic block signal system, less installation costs. The road insisted that it is financially unable to bear the expense of installing and maintaining the protective devices prescribed by the commission.

Seaboard's Contentions — The Seaboard Air Line contends that cab signal devices should be installed only on those locomotives which are operated at speeds of 80 m.p.h. or more. At the same time, it said the commission should modify its June 17 order so that it will supersede in so far as completion dates are concerned, an order in which the commission, as reported in *Railway Age* of May 4, 1946, page 940, required the installation of a block signal system on certain S. A. L. lines. The road asserted that the present order is "more stringent" with respect to speeds and "is intended to supersede the completion schedules [which extend to April 1, 1950] prescribed by the earlier order."

The Southern Pacific, which operates its "City of San Francisco" in excess of 80 m.p.h. in the territory between Oakland, Cal., and Ogden, Utah, also contends that cab signals or train-stop or control protection should be installed only on locomotives used to haul trains at authorized speeds of 80 m.p.h. or more. It said that the Oakland-Ogden segment is protected by an automatic block signal system.

Among other roads replying to the commission's order, the 81.2-mile Atlanta & St. Andrews Bay, which operates only one scheduled passenger train each way daily, said it would have to spend $500,000 to install automatic block signals. Such an expenditure, it asserted, would impair its ability to perform its public servce, adding that its net profits for the past 10 years have been invested in roadbed improvements and in the purchase of new rolling stock "with a view of improving safety conditions on the line and enabling it to better perform its public service." The petitioner said that its passenger trains do not operate in excess of 60 m.p.h., and that the average speed of its freight trains is 25 m.p.h.

The Chicago, Rock Island & Pacific, which said that the cost of complying with the commission's order would be approximately $9,079,000, asserted that the commission should modify the order to permit it to operate some of its passenger trains over certain portions of its track at 60 m.p.h. or more without installing a block signal system and so that it may continue to operate some passenger trains over certain portions of its line, protected by automatic block signals, at 80 or 90 m.p.h. without installing train-stop or train-control systems or cab signals. According to th Rock Island, 3,028 miles of its road a now protected by automatic block signal

Burden Too Great—The Chicago, S Paul, Minneapolis & Omaha, observing th the installation of commission-prescrib signals would cost approximately $6 millio said that speeds of 80 m.p.h. are maintaine predominantly by streamlined passenge equipment which has a lower center of gra ity and is equipped with high speed electr brakes. It added that in block signal te ritory, its train and engine service em ployees are trained to strictly observe signa indications as well as the restrictions con tained in operating rules, timetables an train orders.

According to this road, which operate its trains under timetable, train order permissive manual block and automat block systems, there is no need for installa tion of automatic or manual block signa systems or train-control on those terri tories where passenger trains are operate at 80 m.p.h. or more. Carrying out suc an order, it said, would impose upon it a "undue financial burden" with consequen risk of curtailment of expenditures for es sential improvements.

The Chicago & North Western said would be required to make an expenditur of approximately $16 million on thos portions of its line where maximum trai speeds are 60 m.p.h. or more. It asked th commission to postpone indefinitely th effective date of its order, or, after furth hearing, to permit the C. & N. W. to con tinue to operate its trains at present au thorized maximum speeds (varying up t 100 m.p.h. for passenger trains and 3 m.p.h. for freight trains) under the exis ing methods of operation.

The Union Pacific seeks modification o the order to permit it to operate certain streamlined passenger trains up to and in cluding 90 m.p.h. between Julesburg, Col and Denver, 197 miles; Pocatello, Idaho and Huntington, Ore., 336 miles; and Ogden, Utah, and Los Angeles, Cal., 821 miles, all of which are protected by auto matic block signals. The latter segment in cludes 101 miles of track owned by the Atchison, Topeka & Santa Fe. The U. P said that the cost of installing automatic cab signal devices on those lines would amount to approximately $3,193,000.

The Santa Fe desires to operate its pas senger trains at the maximum speed of 85 m.p.h. over those portions of its line be tween Barstow, Cal., and Mojave, 71.6 miles; Bakersfield and Stockton, 236.2 miles; and Santa Ana and Sorrento, 73.4 miles. Those segments are protected by automatic block signals, the Santa Fe noted adding that a C. T. C. system also is used on the Santa Ana-Sorrento segment. In stallation of C. T. C. also is planned for the Barstow-Mojave and Bakersfield-Stockton lines, it said. On its lines other than those mentioned which are controlled by auto matic block signals, the Santa Fe would operate its passenger trains at a maximum speed of 80 m.p.h.

Among other roads which also have appealed to the commission for modifica tion and/or reconsideration of its June 17 order include the Bessemer & Lake Erie Texas & New Orleans; Gulf, Mobile & Ohio; Chicago & Eastern Illinois; Burling

News Department continued on next left-hand page.

GIVE MORE WORK

—— *to the modern iron horse*

Modern steam locomotives are more efficient to operate than older power because they have the capacity to keep heavy loads rolling . . . at high speeds. Yet locomotives are often seen lying idle in the yards . . . because schedules have not been streamlined to keep pace with the improvements in the modern steam locomotive.

The true savings of Modern Power cannot be realized until maximum utilization has been achieved. To get maximum returns from the dollars invested in your modern steam locomotives calls for a study of their availability . . . and a streamlined scheduling program that is based on utilizing them as much as possible.

LIMA LOCOMOTIVE WORKS

INCORPORATED, LIMA, OHIO

ton-Rock Island; Fort Worth & Denver City; the Minneapolis, St. Paul & Sault Ste. Marie; the Toledo, Peoria & Western; Spokane, Portland & Seattle; St. Louis-San Francisco; and Boston & Maine-Maine Central.

The commission has extended until September 16 the time within which the Missouri Pacific and affiliated lines may file petitions for exceptions from the order or for modification of the same directive. As noted in *Railway Age* of August 16, page 71, the M.P. had sought an extension until February 16, 1948.

Presidents of Three Railroads Testify in Wage Case

A. T. Mercier, president of the Southern Pacific, appeared before the wage case arbitration board at Chicago on August 19, demonstrating how the 20-cent hourly increase in non-operating employees' wages, if granted, would affect that system. Mr. Mercier estimated that the increased payroll cost would be about $34,300,000 annually, to which would be added $2,700,300 in payroll taxes. The amount of the increase alone, Mr. Mercier pointed out, would be almost 2½ times the amount paid to the company's stockholders in 1946.

He then compared the cost of the increase to the total expenditures for additions and betterments in 1946, amounting to $26,000,000. "Present plans," Mr. Mercier told the board, "call for the acquisition in the immediate future of over $51,000,000 worth of equipment for our transportation system. In addition, the Pacific Fruit Express Company, in which we have a half interest, is acquiring 5,000 refrigerator cars at a total cost of about $37,000,000. Any factor which defeats or impairs our ability to make these expenditures, and thus improve our plant and service, is directly opposed to the interest of the public, not only in our territory but everywhere."

Gustav Metzman, president of the New York Central, then testified in behalf of the carriers on August 20, presenting the 1946 annual report of his company as an exhibit. Mr. Metzman told the board that dividends paid on upwards of $562,000,000 capital stock during the last 15 years amounted to only $35,460,000. In 1946 the New York Central paid $15,032,782 in retroactive wage awards alone, suffering a net deficit in excess of $10,000,000 for the year's operations. While relief in the form of freight rate increases was granted effective July 1, 1946, there was no way of offsetting the retroactive wage increase and "for that reason," Mr. Metzman stated, "even when wage increases are warranted they should not be made retroactive." Declaring that, "if the railroad industry is so burdened that it can no longer pay its way, no longer has any credit with the investing public, and as a result suffers deterioration, then we may look for its eventual disintegration as a privately-owned, privately financed enterprise."

Ernest E. Norris, president of the Southern, also testified on August 20, submitting an exhibit which contained estimated operating results for the current year. These results at existing wage levels indicate a net income of $6,732,153. Deducting the wage demands and resulting payroll taxes, and allowing for income tax adjustment, a net deficit of $5,116,769 is indicated. Mr. Norris told the board that the Southern's wage costs for the last decade were $701,000,000, and that during the same period social security and unemployment compensation contributions by the carrier totaled $38,000,000. Carrier contributions toward funds for the social benefit of employees exceeded dividends during that 10-year period by more than $11,000,000.

In the operating brotherhoods' case, the Bureau of Information of the Eastern Railways advised the five transportation unions on August 15 that an Eastern Carriers' Conference Committee had been appointed to represent the eastern railroads in the further handling of the rules change proposals. The southeastern and western territories are expected to follow suit.

Freight Car Loadings

Loading of revenue freight for the week ended August 16 totaled 906,305 cars, the Association of American Railroads announced on August 21. This was an increase of 1,061 cars, or 0.1 per cent, above the previous week, an increase of 18,752 cars, or 2.1 per cent, above the corresponding week last year, and an increase of 253,473 cars, or 38.8 per cent, above the comparable 1945 week, which included the V-J Day work holiday.

Loadings of revenue freight for the week ended August 9 totaled 905,244 cars, and the summary for that week as compiled by the Car Service Division, A. A. R., follows:

Revenue Freight Car Loading

For the Week Ended Saturday, August 9

District	1947	1946	1945
Eastern	158,461	161,881	158,599
Allegheny	191,255	194,234	190,393
Pocahontas	70,856	72,663	58,886
Southern	129,277	130,993	122,872
Northwestern	142,381	138,332	135,289
Central Western	142,134	135,680	134,202
Southwestern	70,880	65,303	69,761
Total Western Districts	355,395	339,315	339,252
Total All Roads	905,244	899,086	870,002
Commodities:			
Grain and grain products	67,303	53,864	63,494
Livestock	12,368	16,228	14,926
Coal	178,105	185,661	168,387
Coke	13,831	14,032	14,028
Forest products	49,088	49,657	46,358
Ore	80,951	73,575	72,845
Merchandise l.c.l.	113,429	123,354	106,832
Miscellaneous	390,169	382,715	382,132
August 9	905,244	899,086	870,002
August 2	921,591	898,391	863,910
July 26	919,928	910,513	886,430
July 19	919,734	921,496	882,648
July 12	806,961	895,082	883,543
Cumulative total, 32 weeks	26,773,222	24,220,205	26,391,742

In Canada.—Car loadings for the week ended August 9 totaled 72,662 cars as compared with 79,010 cars for the previous week and 66,847 cars for the corresponding week last year according to the compilation of the Dominion Bureau of Statistics.

	Revenue Cars Loaded	Total Cars Rec'd from Connections
Totals for Canada:		
August 9, 1947	72,662	34,773
August 10, 1946	66,847	35,268
Cumulative totals for Canada:		
August 9, 1947	2,327,514	1,171,183
August 10, 1946	2,139,136	1,084,614

F.T.C. Complaint Against Steel Industry Hits Basing Points

The Federal Trade Commission, in a complaint issued this week, charged the American Iron & Steel Institute and its 100-odd members, including all important iron and steel producers, with engaging in a "wrongful and unlawful" conspiracy to fix and maintain identical delivered price quotations and to "restrain and destroy" competition in the sale of iron and steel products.

While the complaint is directed generally against all members of the institute, it specifically names as respondents 26 corporations as representatives of the membership. These corporations, numbering nine principal producers and 17 subsidiaries, include the United States Steel Corporation; Tennessee Coal, Iron & Railroad Company; Bethlehem Steel Corporation; Republic Steel Corporation; Youngstown Sheet & Tube Company; National Steel Corporation; Inland Steel Company; Jones & Laughlin Steel Corporation; American Rolling Mill Company; and the Wheeling Steel Corporation. The 26 firms, according to the F. T. C., account for approximately 80 per cent of the nation's total steel ingot producing capacity.

Among other things, the complaint alleges that the producers would be in "active and actual competition with each other as to price and as to matters directly and substantially affecting prices."

With respect to transportation of their products, the complaint states that the respondents have agreed upon a common list of charges to be added to base prices in lieu of switching, shipping and freight charges. It said that the charges have been compiled and published by the institute and employed by the producing respondents in the calculation of delivered price quotations.

In using this system, the respondents have "refused to assess their charges for delivery according to the actual cost . . . and have calculated their delivery charges on the fiction that each shipment is made from one of a limited number of basing points cooperatively used and recognized among producer-respondents," the F. T. C. added.

Another so-called "fiction" described by the complaint is the assessment of delivery charges on the basis of shipment by all-rail freight when the method of delivery actually employed was "frequently" by truck or water carrier at lower rates. The F. T. C. said that "arbitrary amounts" also have been added to delivered prices as "switching charges," rather than the actual charges imposed by the railroads for switching.

When asked to comment on the proceeding, Irving S. Olds, chairman of the board of directors of the United States Steel Corporation, stated:

"The latest attack by the Federal Trade Commission on the basing point method of marketing steel products . . . is essentially the same accusation of collusive price action as has been made by the commission in earlier years. In our opinion, the basing point charges now made . . . have no more basis in fact or in law than the similar unfounded accusations advanced by the commission in our basing point hearings before

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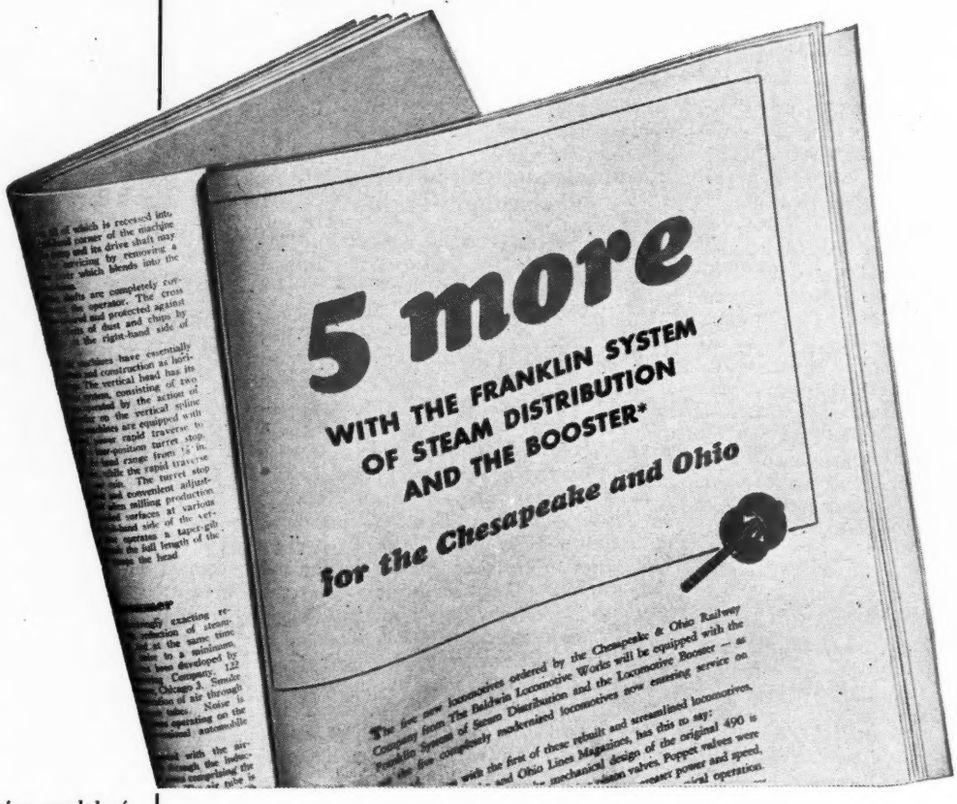
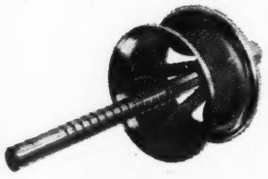
C&O WILL USE TYPE B



A full-size running model of the Franklin System of Steam Distribution Type B will be exhibited at the Allied Railway Supply Association Exhibit, Hotel Sherman, Chicago, September 15, 16, 17 and 18.

The Franklin System of Steam Distribution, Type B — with poppet valves, rotary drive, and continuous-contour cams — will be applied to the new 4-6-4 locomotives recently ordered by the Chesapeake & Ohio from the Baldwin Locomotive Works.



FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK • CHICAGO • MONTREAL

STEAM DISTRIBUTION SYSTEM • BOOSTER • RADIAL BUFFER • COMPENSATOR AND SNUBBER • POWER REVERSE GEARS
AUTOMATIC FIRE DOORS • DRIVING BOX LUBRICATORS • STEAM GRATE SHAKERS • FLEXIBLE JOINTS • CAR CONNECTION

the Temporary National Economic Committee in 1939 and 1940. It was testified in those hearings that the basing point practice of delivered prices in the steel industry is not a collusive or illegal arrangement, but on the contrary is a method of marketing steel products which has evolved over the past 50 years or more as a natural consequence of the fundamental economic and competitive conditions existing in that industry.

Discuss Proposed Rules Changes for Pullman Conductors

A proposal for revisions of working rules affecting Pullman conductors, made by the order of Railway Conductors, Pullman System, and counter-proposals set forth by the Pullman management, were discussed by representatives of the two parties at a conference in Chicago last week, following a similar conference between the union and the management of the Chicago, Milwaukee, St. Paul & Pacific concerning changes which would affect the sleeping and parlor car conductors of that road.

The union recently notified the Pullman and Milwaukee managements that it desired a shorter work month, a revision in computing overtime and other changes in working conditions for Pullman conductors and sleeping and parlor car conductors. The Pullman Company subsequently served the union with its proposal for rules changes.

July Ton-Miles

The volume of freight traffic handled by Class I railroads in July was one-tenth of one per cent above the corresponding 1946 month, and amounted to 52 billion ton-miles, according to a preliminary estimate by the Association of American Railroads.

The table summarizes revenue ton-miles for the first seven months of 1947 and 1946:

	1947	1946	Per cent Increase
January ..	53,294,374,000	48,225,789,000	10.5
February .	48,485,909,000	45,080,780,000	7.6
March ...	56,148,921,000	52,393,533,000	7.2
April	50,693,767,000	37,407,551,000	35.5
May	56,125,538,000	39,462,227,000	42.2
June ....*a*	52,900,000,000	49,783,762,000	6.3
July ....*b*	52,000,000,000	51,926,468,000	0.1
Total seven months ..	369,643,958,000	324,254,784,000	14.0

a Revised estimate.
b Preliminary estimate.

More Benefits During 1946-1947 Than in Any Previous Year

All phases of the Railroad Retirement Board's benefit operations set records for activity during the 1946-1947 fiscal year ended June 30, when 490,000 persons were paid $220,000,000 in benefits under the Railroad Retirement and Railroad Unemployment Insurance Acts, according to the August issue of the board's "Monthly Review." Much of the stepped-up rate of activity was brought about by the changes in the laws made by Congress in the early part of the year, the review stated.

A total of 125,558 retirement and death benefits were awarded or increased, and over $173,000,000 was paid out during the year. New applications for retirement benefits reached 44,300—a 47-per cent jump from the preceding year. New awards were made in 28,673 cases, and 45,545 annuities previously awarded were raised.

Death benefits set the pace for the entire retirement program. The 48,748 individual death benefits paid included 33,552 monthly annuities of the new types provided by the amendments. Of these, 28,798 were made to widows aged 65 and older; 1,620 to younger widows with children; 3,106 to children; and 28 to parents.

During the year, unemployed railroad workers filed 257,000 applications for benefits, according to the review, and 208,000 benefit accounts were opened. Payments for unemployment claims—far ahead of any previous year—reached 1,583,000, with $46,617,000 paid out.

Monon Inaugurates Streamlined Passenger Trains

Streamlined passenger service on the Chicago, Indianapolis & Louisville became effective on August 17 as the "Tippecanoe," newly christened by Mrs. Emil Schramm, wife of the president of the New York stock exchange, departed from Indianapolis Union Station on its maiden voyage to Chicago. The right-of-way was lined with spectators eager to see the six-car red and gray streamliner go by, heralding another stage of development in the "New Monon."

Later the same day, at Chicago, John T. McCutcheon, famed Hoosier cartoonist, christened the "Hoosier," another streamliner, prior to its maiden run to the Indiana state capital. The "Tippecanoe" and the "Hoosier" are both Diesel-powered, made up of luxurious coaches, club-bar-dining and parlor-observation cars rebuilt from U. S. Army hospital cars at the Monon's LaFayette shops. As quickly as additional equipment can be converted, other Monon passenger service will be streamlined so that in the near future all trains will consist of the latest type equipment.

A list of current publications appears on page 72.

Supply Trade

Ralph A. Corley, Jr. and **Robert N. Corley,** sons of Ralph A. Corley, the late president of the **Corley Company,** will carry on the business, it has been announced.

The **Barrett-Cravens Company** has announced the appointment of **W. F. Hebard & Co.** as its sales and service representatives for railroads in the Chicago area.

Selby F. Greer, formerly assistant general sales manager, has been appointed general sales manager for the Kellogg division of the **American Brake Shoe Company** to succeed **H. O. Holland.** Mr. Holland, a vice-president, will assume new duties, it was announced.

Joe Weston has been appointed director of field service of the **Douglas Fir Plywood Association.**

Paul D. Davison has been appointed works manager of the new **Evans Products Company** plant near Plymouth, Mich. Born in Swartz Creek, Mich., in 1900, Mr. Davison was graduated from the Ferris Institute, Big Rapids, Mich., in 1925 with degrees in business management and accounting. During the next four years he was employed as an auditor in the Detroit, Mich., offices of the C. G. Spring & Bumper Co., for which he handled the consolidation with the Houdaille-

Paul D. Davison

Hershey Corporation. In 1929 he was appointed assistant secretary and assistant treasurer of Houdaille-Hershey. Three years later he became vice-president in charge of west coast operations for California Majestic, a subsidiary of Grigsby-Grunow. In 1939 Mr. Davison was made general manager for the Mitchel division of the United Specialties Company.

Roger G. DeLong and **W. B. Gibson** have been appointed, respectively, manager and sales manager of the hydraulics division of the **Twin Disc Clutch Company.** Mr. DeLong, who has been serving as acting manager and sales manager of the firm's Rockford, Ill., division, was grad-

Roger G. DeLong

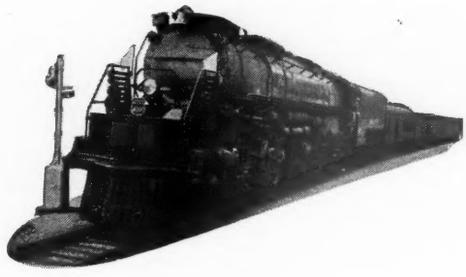
uated in 1938 from Purdue University with a degree in mechanical engineering. During the summer months he was employed by the Waukesha Motor Company in the experimental and fuel research laboratories. After graduation from Purdue Mr.

News Department continued on next left-hand page.

DOLLARS

SLIP AWAY

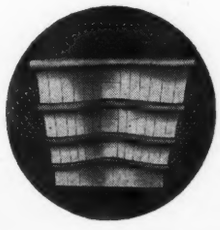
when a steam locomotive operates without a full brick arch in its firebox, because it is not getting full value from the tons of coal it burns.



The expense of maintaining the arch in proper condition at all times is negligible compared with the resulting gain in heating efficiency and fuel economy.

And to secure the utmost effectiveness from the fuel consumed, there is a specific design of Security Brick Arch for each class of locomotive.

HARBISON-WALKER REFRACTORIES CO.
Refractories Specialists



AMERICAN ARCH CO. INC.
60 East 42nd Street, New York 17, N. Y.
Locomotive Combustion Specialists

DeLong attended the Harvard School of Business Administration for one year and then joined Twin Disc as an installation engineer. In 1942 he moved to Rockford when the hydraulics division was established and was subsequently promoted, successively, to chief installation engineer, assistant sales manager, sales manager and acting division manager.

Mr. Gibson was graduated from the United States Military Academy in 1930.

W. B. Gibson

He spent five years in the engineering department of the American Telephone & Telegraph Co. Following a three-year period with the Oil Well Supply Company in the engineering department at Dallas, Tex., he joined Twin Disc Clutch in 1940. In 1942, after two years in the hydraulics division as a service engineer, Mr. Gibson entered the army. Three years later, he returned to the company a assistant district manager in the eastern territory.

Robert J. Drewniak, whose appointment as assistant to the president of the **Apex Railway Products Company,** Chicago, was reported in *Railway Age* of August 16, was formerly associated with

Robert J. Drewniak

the A. O. Smith Corporation, Milwaukee, as district sales division manager. Mr. Drewniak was born at Milwaukee, and received his higher education at Marquette University.

J. G. Green, for the past five years assistant general manager of the Philco storage battery division of the Philco Corporation, has been appointed mid-western representative for the Baker industrial truck division of the **Baker-Rauleng**

J. G. Green

Company. Mr. Green plans to make his headquarters at 407 South Dearborn street, Chicago. After being graduated from Pennsylvania State College, where he specialized in electrical engineering, Mr. Green was connected with the Westinghouse Electric & Manufacturing Co. for eleven years. He served first in the railway engineering equipment department and later as manager of industrial sales in the Pittsburgh, Pa., office. In 1935 he established the J. G. Green Company in Pittsburgh to provide engineering service and to act as a manufacturers' agent. Before joining Philco, Mr. Green worked as assistant sales manager for the Louis Allis Company in Milwaukee, Wis.

T. H. Bickerstaff has been appointed representative of the **Westinghouse Air Brake Company,** with headquarters in Chicago. Formerly a locomotive engineer on the Atchison, Topeka & Santa Fe, Mr. Bickerstaff joined Westinghouse Air Brake in April, 1946, and in July of that year was assigned to the Chicago office as mechanical expert.

T. H. Bickerstaff

The company also has announced that **D. G. Blaine,** engineer and **W. K. Fry,** mechanical expert, have been transferred from the home office at Wilmerding, Pa., to Chicago, and **W. V. Steele** and **H. W. Wiss** have been assigned to the New York office, where they will work in engineering capacities.

OBITUARY

Ralph A. Corley, president of the Corley Company, died on August 14, at his home in Mountain Lakes, N. J., after a long illness. Mr. Corley was born in Montreal, Que., in 1884, and came to the United States as a young man. He became

Ralph A. Corley

associated with the Canadian-Fairbanks Company in 1909 and in 1911 joined the Michigan Wheel Company. He formed the firm of Young, Corley & Dolan in 1915 and the Corley-DeWolf Company in 1919, shortly after which the latter became the Corley Company. Mr. Corley was president of the company for the 26 years of its existence.

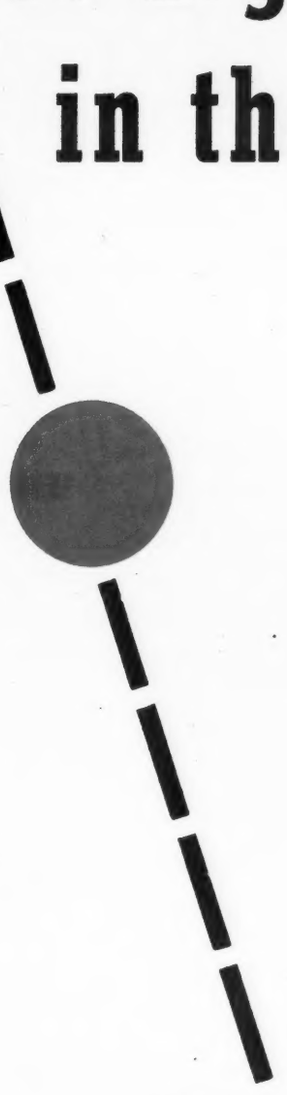
Safford Kinkead Colby, vice-president in charge of research and advertising of the Aluminum Company of America, died on August 4, in Pittsburgh, Pa. Mr. Colby was born at Vallejo, Cal., in 1873. In

Safford Kinkead Colby

1895 he joined the Pittsburgh Reduction Company (which became the Aluminum Company of America in 1907) as assistant manager of its New York office, and later he was appointed manager. In 1905 he was placed in charge of the company's Pacific coast representatives and in 1913

News Department continued on next left-hand page.

A *Red* Beacon *Warns* of High Water in the Boiler



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During adjustment of the water supply to boiler the Elesco steam dryer system prevents the carryover from entering the drypipe, by separating the water from the steam and automatically ejecting it outside of the boiler.

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he returned to the east, where two years later he was appointed assistant general sales manager, with headquarters in New York. He was elected president of the American Magnesium Corporation in 1920 and president of the American Body Company in 1925. The latter was a manufacturing subsidiary of the Aluminum Company at Buffalo, N. Y. In 1928, Mr. Colby was placed in charge of the sales promotion and advertising divisions at Pittsburgh. He became a vice-president of the Aluminum Company in 1931 and, in 1937, the supervision of the aluminum research laboratories was added to his duties.

William Porter Burleigh, who engaged in sales engineering and promotion work for several firms during a 20-year period prior to the war, and who, more recently, was a lieutenant commander in the Naval Reserve, died on August 13 at Boston, Mass. Commander Burleigh was associated with the American Chain Company, Bridgeport, Conn., from 1923 to 1931; with Clarence Whitman & Sons, New York, from 1931 to 1934; and with the Bird Machine Company, South Walpole, Mass., from 1935 to 1942.

Car Service

The Interstate Commerce Commission has issued Revised Service Order No. 552, effective August 21 through November 20, inclusive, which appoints W. R. Godber, joint manager of the Anthracite Tidewater Emergency Bureau and Northern Tidewater Bituminous Emergency Bureau, New York, as an agent of the commission's Bureau of Service and authorizes him to control the movement of tidewater coal and coke moving to Middle Atlantic ports. The order applies to intrastate as well as interstate and foreign traffic.

All unit permit requirements for the shipment of overseas freight were revoked August 16 by the Office of Defense Transportation. The action will enable all export shipments as specified in General Order 16C to move from point of origin to port of export under a general permit comprised of a certification by the shipper to the origin carrier that a firm steamship booking has been secured or that port storage arrangements have been made, the O.D.T. said, adding that carriers will continue to be responsible for the refusal of any such shipments which do not comply with the certification specifications.

The O.D.T. also has revised the loading requirements on Concord grapes or related varieties in carloads. Under General Permit O.D.T. 18A, Revised-32, effective August 19 through September 30, they must be (1) packed in baskets of approximately 6 lb. gross weight each and loaded nine tiers high covering the entire floor space of the car; or (2) packed in baskets of approximately 18½ lb. gross weight each and loaded seven tiers high covering the entire floor space of the car; or (3) packed in bushel baskets and loaded four tiers high covering the entire floor space of the car; or (4) packed in trays of approximately 35 lb. gross weight each and loaded six tiers high covering the entire floor space of the car.

Financial

BALTIMORE & OHIO.—*Equipment Trust Certificates.*—This company has requested bids on $5,600,000 of proposed series V equipment trust certificates to be dated September 1, 1947, subject to Interstate Commerce Commission approval. The certificates, to mature in ten equal installments on each September 1 from 1948 to 1957, inclusive, are being issued to finance up to 80 per cent of the cost of 2,000 50-ton open-top steel hopper cars.

ILLINOIS CENTRAL. — *Equipment Trust Certificates.*—Division 4 of the Interstate Commerce Commission has authorized this road to assume liability for $1,200,000 of Series X equipment trust certificates, the proceeds of which will be applied toward the purchase of 400 hopper cars, at an estimated unit price of $3,865, as outlined in *Railway Age* of July 26, page 102. The applicant has applied to the commission for authority to assume liability for $4,400,000 of Series X certificates, but desires to issue only $1,200,000 of them at present. The remainder of the issue will be applied toward the purchase of 1,000 more hopper cars and certain passenger equipment. The certificates will be payable in semi-annual installments of $220,000 each, from February 1, 1948, to August 1, 1957, inclusive. They were sold to the Mercantile-Commerce Bank & Trust Company of St. Louis, Mo., and associates, on a bid of 99.3705 with a 2 per cent interest rate, on which basis the average annual cost will be approximately 2.13 per cent.

NEW YORK CENTRAL.—*Equipment Trust Certificates.*—Division 4 of the Interstate Commerce Commission has authorized this road to assume liability for $9,400,000 of 2⅛ per cent equipment trust certificates, the proceeds of which will be applied toward the procurement of equipment, estimated to cost $12,867,800, as outlined in *Railway Age* of July 26, page 102. The certificates will mature in 10 equal annual installments, starting August 15, 1948. The commission's report also approves a selling price of 99.532 with a 2⅛ per cent interest rate, the bid of Halsey, Stuart & Co. and associates on which basis the average annual cost will be approximately 2.22 per cent.

PENNSYLVANIA.—*Reduces New Haven Holdings.*—This company has sold 10,300 shares of the capital stock of the New York, New Haven & Hartford, thus reducing its holdings of that issue to 195,000 shares. The Pennsylvania Company, a subsidiary, has purchased 160 additional Pennsylvania subsidiary, has purchased 160 additional common and 25,285 additional 4½ per cent preferred shares of the Wabash, increasing its holdings to 592,958 common and 172,904 preferred shares.

SOUTHERN PACIFIC.—*Equipment Trust Certificates.*—This road has sold, subject to Interstate Commerce Commission approval, $11,400,000 of one- to ten-year series V equipment trust certificates to the First National Bank of New York and associates on a bid of 99.76 for a 2 per cent coupon. The sale price represents an interest cost of about 2.047. (See *Railway Age* of August 2, page 62.)

Dividends Declared

Delaware & Bound Brook.—50¢, quarterly, payable August 20 to holders of record August 12.

Virginian.—common, 62½¢, quarterly, payable September 25 to holders of record September 11; 6% preferred, 37½¢, quarterly, payable November 11 to holders of record October 15; 6% preferred, 37½¢, quarterly, payable February 2 to holders of record January 15; 6% preferred, 37½¢, quarterly, payable May 1 to holders of record April 15; 6% preferred, 37½¢, quarterly, payable August 2 to holders of record July 15.

Average Prices Stocks and Bonds

	Aug. 19	Last week	Last year
Average price of 20 representative railway stocks..	48.99	48.43	61.51
Average price of 20 representative railway bonds..	89.71	89.66	97.68

Equipment and Supplies

FREIGHT CARS

The CHICAGO, BURLINGTON & QUINCY is inquiring for 200 70-ton tank cars.

The PENNSYLVANIA is inquiring for 500 to 2,000 50-ton box cars of type X41B and 500 to 2,000 50-ton box cars of type X41C.

The LEHIGH VALLEY is inquiring for 500 55-ton hopper cars.

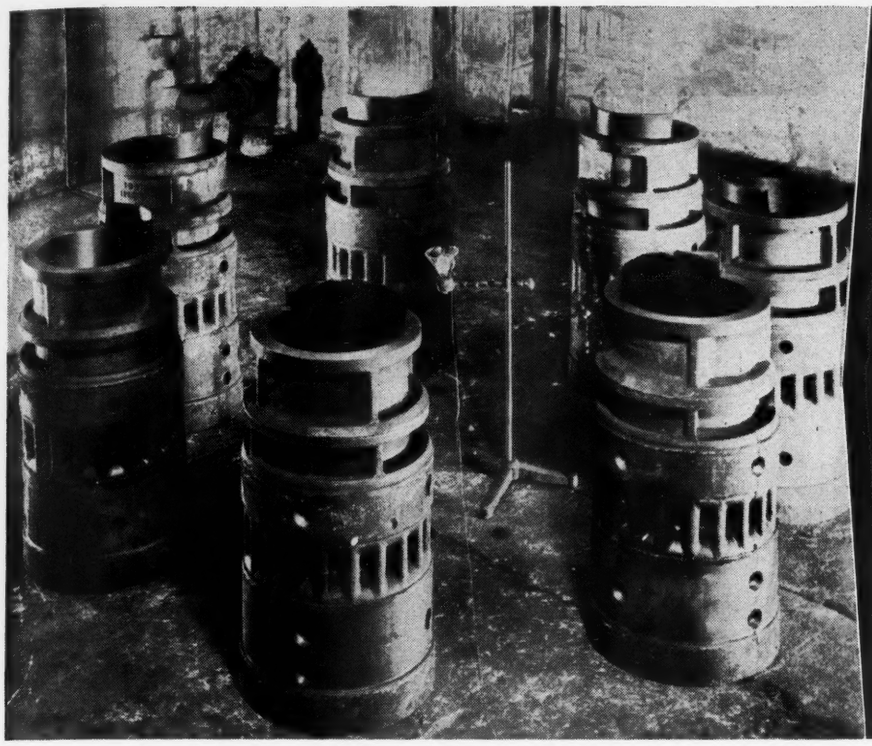
Construction

Complete R. I. Track Relocation

The Chicago, Rock Island & Pacific's $15,000,000 track relocation program begun five years ago to improve the route between Chicago and Kansas City, Mo., was completed on August 15, when a 17-mi. segment of track between Ainsworth, Iowa, and Brighton was placed in service. The program involved the purchase of rights-of-way and the construction, principally in eastern Iowa, of 90 mi. of new roadbed, track and bridges. Seventeen steel railroad bridges and 30 highway bridges were built as part of the project, which reduced mileage substantially, eliminated sharp curves and steep grades. The installation of modern signal systems was accomplished at the same time.

BANGOR & AROOSTOOK.—This road has awarded a contract to T. W. Cunningham, Inc., Bangor, Me., for the construction of a brick station at Van Buren, Me. The estimated cost of the building is $33,200. A project involving the replacing of main spans on bridges No. 18.37 (Winterport,

News Department continued on next left-hand page.



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INSIDE the glass funnel on the stand is a minute quantity of radium. The black envelopes stuck in the Diesel liners contain films to record the radiations which penetrate the castings. Thus we discover hidden defects, danger spots which may mean failure.

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Cylinder Packing Rings	Hub Liners	Duplex Sectional Type Packing for Cylinders and Valves (Duplex Springs for Above Sectional Packing)
Pistons or Piston Bull Rings	Shoes and Wedges	
Valve Bushings	Floating Rod Bushings	
Valve Packing Rings	Light Weight Valves	Cylinder Snap Rings
Valve Bull Rings	Cylinder Liners and Pistons for Diesel Service	Valve Rings, All Shapes

Me.) and No. 27.73 (Hampden, Me.) has been authorized. Orders for the replacement parts have been placed with the Bethlehem Steel Company. The probable cost of this project is $70,000.

BESSEMER & LAKE ERIE.—This company has awarded a contract to the Ferguson & Edmondson Co., Pittsburgh, Pa., for the construction of four reinforced concrete pipe culverts in the vicinity of West Springfield, Pa., Keepville, Pennside and Shadeland. The estimated cost of this work is $67,000.

NEW YORK CENTRAL.—This company and the Cleveland, Cincinnati, Chicago & St. Louis have jointly applied to the Interstate Commerce Commission for authority to construct and operate a 2.5-mile extension from the Big Four's line near Pana, Ill., to a connection with the Illinois Central, to serve coal mines in that territory.

RICHMOND, FREDERICKSBURG & POTOMAC.—This company has awarded a contract to the Wise Contracting Company, Richmond, Va., for adding two stories to a present one-story warehouse in Richmond. The estimated cost of this project is $200,000.

READING.—This company has awarded a contract to the Lam Building Corporation, Philadelphia, Pa., for constructing new cold storage rooms in the Reading Terminal Market, Philadelphia. The estimated cost is $80,000.

Organizations

The **Metropolitan Traffic Association of New York** will hold its first meeting of the fall season on September 11 at the Hotel Pennsylvania.

A week-end trip through the California Redwoods has been arranged by the Pacific Coast Chapter of the **Railway & Locomotive Historical Society** on September 13 and 14.

The **Westchester Model Club** will hold its annual exhibition of model railroading at the Pelham Manor, N. Y., station of the New Haven railroad on the first three week-ends of November.

Overseas

GREAT BRITAIN.—The directors of the London & North Eastern have approved proposals for the construction of 25 1,600-hp. Diesel-electric units designed to replace the steam engines now hauling the road's heaviest mainline passenger trains on the east coast route between London and Scotland. This project is being undertaken, the announcement said, to relieve the difficulties caused by the non-availability of steam locomotive power and the shortage of good locomotive coal. The Diesel-electric units will be used in pairs and immediate steps are being taken to work out the project in detail, although under present conditions some time is bound to elapse before their manufacture can be completed.

Railway Officers

EXECUTIVE

William J. Warnick, superintendent of the Toronto, Hamilton & Buffalo, has been appointed assistant to the president, with offices as before at Hamilton, Ont.

The Canadian Pacific has announced a reorganization in its distribution of operational control. Previously divided into two sections known as eastern and western lines, the operating set-up will now consist of three regions, Eastern, Prairie and Pacific. The following personnel adjustments have been made in conjunction with the new arrangement: **George H. Baillie,** general manager of what has been western lines, appointed vice-president of the Pacific region with headquarters at Vancouver, B. C.; **W. A. Mather,** formerly vice-president of western lines, becomes vice-president of the Prairie region with headquarters at Winnipeg, Man., and **N. R. Crump,** vice-president and general manager of former eastern lines, becomes vice-president of the Eastern region with headquarters as before at Toronto, Ont. The appointments are effective immediately.

The New York Central has announced the following executive promotions, effective September 1: **Frank J. Jerome,** assistant to the executive vice-president, appointed to the new position of vice-president in charge of operations and of maintenance of roadway and equipment throughout the Central's system, his headquarters remaining at New York; **R. E. Dougherty,** vice-president, improvements and development, and **J. L. McKee,** vice-president, have been appointed to the new posts of vice-president-assistant to president, their duties to be assigned, with headquarters as before at New York and Chicago, respectively. **J. J. Brinkworth,** vice-president and general manager at Cincinnati, Ohio, with jurisdiction over the Central's Big Four district, succeeds Mr. McKee as System vice-president at Chicago, with jurisdiction over the territory west of Buffalo.

FINANCIAL, LEGAL AND ACCOUNTING

R. W. Woody, assistant auditor, revenue, of the Chesapeake & Ohio at Richmond, Va., has been appointed revenue assistant, office of comptroller with headquarters at Cleveland, Ohio.

Andrew T. Haugen, whose promotion to auditor of disbursements of the Minneapolis, St. Paul & Sault Ste. Marie, and the Duluth, South Shore & Atlantic, at Minneapolis, Minn., was reported in *Railway Age* of August 9, was born on February 29, 1896, at Price County, Wis., and received his higher education at Morningside College and the Minnesota College of Law. He entered railroad service with the Soo line in 1917 as a clerk in the accounting department, and served as bureau head from 1922 to 1927. In the latter year he was appointed chief joint facility accountant, which position he held until April, 1943, when he became chief clerk in the capital expenditures section. In November, 1943, Mr. Haugen was advanced to assistant auditor of disbursements, in which capacity he was serving at the time of his recent promotion.

OPERATING

E. K. Mentzer has been appointed assistant to general manager of the Boston & Albany with headquarters at South station, Boston, Mass. Mr. Mentzer will perform such duties as may be assigned to him by the general manager.

Edward G. Fischer has been appointed station master of the Grand Central Terminal, New York, succeeding **Edward J. Connors,** who has retired after more than 52 years of service.

Thomas L. Coughlin has been appointed assistant general manager of the Toronto, Hamilton & Buffalo, with headquarters at Hamilton, Ont., and **L. Harrington** has been appointed superintendent, also at Hamilton. Mr. Harrington succeeds **William J. Warnick,** appointed assistant to the president.

W. E. Kamm, superintendent, Cleveland division of the New York Central, has been appointed assistant to assistant general manager, with headquarters as before at Cleveland, Ohio. He is succeeded as division superintendent by **W. H. Leahy,** whose position as assistant superintendent, Erie division, at Erie, Pa., has been assigned to **J. E. Guilfoyle,** transferred from Buffalo, N. Y. **H. D. Johnston** has been appointed assistant superintendent of the Buffalo division at Buffalo, succeeding Mr. Guilfoyle.

Frank S. Worthington, superintendent of the New Orleans & Northwestern (part of the Southern) at Hattiesburg, Miss., has been appointed superintendent of the Southern, with headquarters at Louisville, Ky., succeeding **Durland E. Clark.** Mr. Worthington is succeeded by **Ralph C. Wilson.**

William T. Wohlford, whose retirement as superintendent of the Clinchfield, at Erwin, Tenn., was reported in *Railway Age* of August 16, was born on October 27, 1875, at Mechanicsburg, Va., and entered railroad service in 1892, with the Norfolk & Western at Bluefield, W. Va. He became associated with the Carolina, Clinchfield & Ohio (now Clinchfield) in 1908 as assistant trainmaster, and in 1914 was appointed superintendent of construction of that road's Elkhorn extension. The following year Mr. Wohlford became trainmaster, which position he held until 1918, when he joined Carbo Coal at Clinchfield, Va. Rejoining the railroad in 1920, he subsequently served as conductor, assistant trainmaster and trainmaster. In 1944 he was advanced to superintendent, the position he held at the time of his retirement.

Jerry B. Briscoe, superintendent of the Atchison, Topeka & Santa Fe, with headquarters at Amarillo, Tex., whose re-

News Department continued on next left-hand page.

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REDUCE MAINTENANCE COSTS • PROVIDE MAXIMUM SAFETY • SPEED TRAINS ON THEIR WAY

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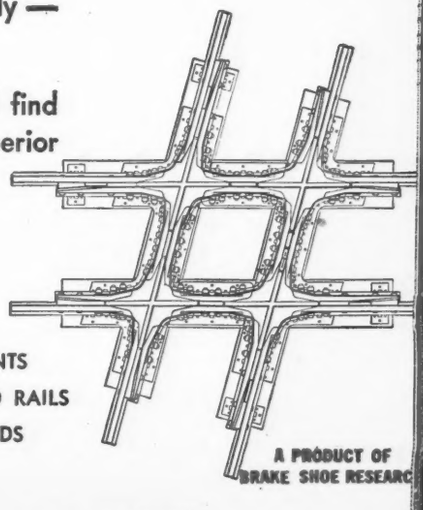

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tirement was reported in *Railway Age* of August 9, was born at Frankford, Mo., and entered Santa Fe service in 1907 as agent and operator. He subsequently served in various positions in New Mexico, becoming trainmaster at Clovis, N. M., in 1914 and assistant superintendent at Amarillo in 1920. He was promoted to superintendent of the Panhandle division at Wellington, Kan., in 1926, and, except for a short time as acting assistant general manager, had served as superintendent at Amarillo since 1928.

A. B. Shaw, whose appointment as superintendent of stations and freight claim prevention of the Texas & Pacific, at Dallas, Tex., was announced in the *Railway Age* of July 26, was born at Bonham, Tex., on February 7, 1899, and entered railroad service on September 1, 1917, as a clerk with the Missouri Pacific, at Texarkana, Tex. Subsequently he served in various freight station capacities

A. B. Shaw

at that point until 1933, when, following the transfer of the Texarkana Terminal to T. & P. operation, he entered the service of the T. & P. On July 1, 1940, he was promoted to agent at Texarkana, and on April 15, 1946, he was advanced to supervisor of stations, with headquarters at Dallas, Tex., the position he held at the time of his recent promotion.

The New York Central has announced the following personnel advancements as part of a series of changes effective September 1: **D. A. Fawcett,** manager freight transportation at New York, moves to Cincinnati, Ohio, to succeed to **J. J. Brinkworth's** jurisdiction over the Big Four district, with the title of general manager (Mr. Brinkworth's promotion is reported elsewhere in this section); **K. A.Borntrager,** assistant to the vice-president at Chicago, succeeds Mr. Fawcett at New York; **S. L. Price,** assistant manager freight transportation, becomes general superintendent freight transportation, with headquarters continuing in New York; **J. J. Frawley,** assistant general manager, line west of Buffalo (N. Y.), with headquarters at Cleveland, Ohio, has been transferred to Syracuse as assistant general manager of the line Buffalo and east, succeeding **C. A. Raymonda,** who is retiring; **E. J. Gibbons,** assistant general manager of the Big Four district at Indianapolis, Ind., transferred to Cleveland, succeeding Mr. Frawley; **G. W. Birk,** superintendent of equipment of the Big Four district, becomes assistant general manager, Big Four district, at Indianapolis, succeeding Mr. Gibbons, and **F. B. Hank,** becomes assistant to the general manager, line Buffalo and east, with headquarters at New York.

TRAFFIC

John R. Mulroy has been appointed general freight agent of the Chicago, Indianapolis & Louisville, with headquarters at Chicago.

T. A. O'Donnell, assistant general freight agent of the Chicago & North Western at Chicago, has been promoted to general freight agent, with the same headquarters, succeeding **A. O. Olson,** whose promotion to general industrial agent, at Chicago, was reported in *Railway Age* of July 5.

K. R. Coughlin, city passenger agent of the Chicago, Milwaukee, St. Paul & Pacific at Butte, Mont., has been appointed district passenger agent at that point, and the position of city passenger agent has been abolished.

George K. Bennett and **Alfred E. Arensman** have each been appointed general agent, passenger department, of the Illinois Terminal, with headquarters at New York. Mr. Bennett succeeds **J. M. Fowler** whose promotion to assistant general freight and passenger agent at Pittsburgh, Pa., was noted in the August 16 *Railway Age,* and Mr. Arensman replaces **Malcolm A. Harrington,** who has resigned.

H. W. Klein, assistant vice-president of the Southern Pacific at San Francisco, Cal., has been promoted to freight traffic manager in charge of rates and divisions, succeeding **H. C. Hallmark,** who has been granted a leave of absence to engage in special work for the western railroads. Mr. Klein is succeeded by **W. G. Peoples,** freight traffic manager of the Central district, San Francisco, who in turn is succeeded by **C. M. Biggs,** general eastern freight agent at New York. **H. L. Smith,** assistant to freight traffic manager, San Francisco, has been advanced to the new position of assistant freight traffic manager—rates and divisions. **P. P. Dougherty,** assistant general freight agent at San Francisco, has been promoted to assistant to freight traffic manager, Central district, a newly created position.

ENGINEERING & SIGNALING

G. S. Crites, division engineer of the Baltimore & Ohio at Baltimore, Md., has resigned to enter private practice.

W. B. McKenzie has been appointed maintenance bridge engineer of the St. Louis-San Francisco, with headquarters at Springfield, Mo.

Joseph Daniel Hudson, whose appointment as assistant to chief engineer of the Virginian at Norfolk, Va., was announced in *Railway Age* of August 9, was born in Van Alstyne, Texas, on December 15, 1888, and received a bachelor's degree in civil engineering from Mississippi State College n 1915. He entered the service of

Joseph D. Hudson

the Virginian in March, 1918, and except for a short time during World War I, when he served in the United States Army, has been in the continuous service of the Virginian in various capacities, including instrumentman, draftsman, division engineer at Victoria, Va., from 1928 to 1932, and assistant engineer until his recent promotion.

MECHANICAL

M. R. Wilson, master mechanic of the Chicago, Rock Island & Pacific at Blue Island, Ill., has been promoted to superintendent of motive power, with headquarters at Chicago, succeeding **A. R. Ruiter,** who has retired.

Charles C. Robinson, assistant superintendent of car service of the Chicago, Indianapolis & Louisville at LaFayette, Ind., has been appointed acting superintendent of car service, succeeding to the duties of **Henry J. Molke,** who has been granted a leave of absence due to ill health.

SPECIAL

A. H. Ritter has been appointed vice-chairman of the Southern Passenger Association, with headquarters at St. Louis, Mo.

H. P. O'Leary has been appointed special representative, public relations, of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., succeeding **E. G. Ryder,** who has retired.

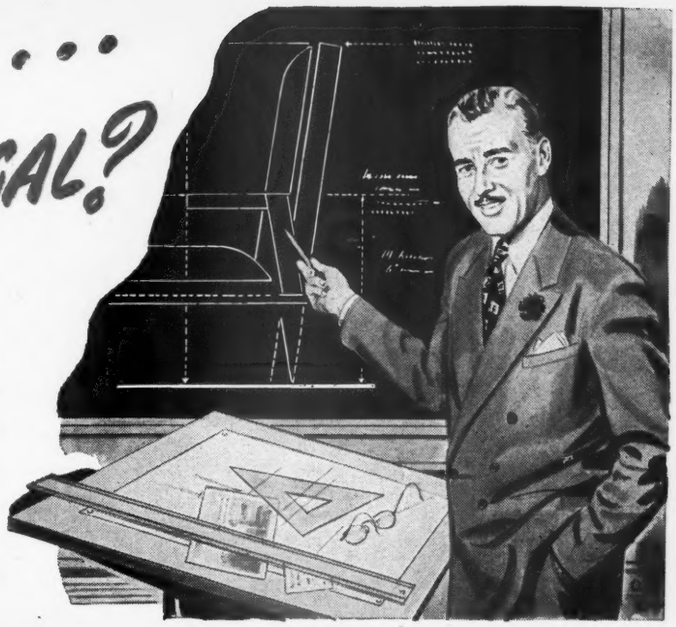
OBITUARY

Theron Payne Hinchcliff, who retired as assistant passenger traffic manager of the Chicago, Burlington & Quincy, at Chicago, last December, died at his home in LaGrange, Ill., on August 13. A sketch of Mr. Hinchcliff's career appeared in *Railway Age* of January 25, in connection with his retirement.

Clarence Gunstead, supervisor of personnel of the Illinois Central at Chicago, died at his home in that city on August 18.

Table of Freight Operating Statistics appears on the next left-hand page.

YES, IT'S BEAUTIFUL . . . BUT IS IT ECONOMICAL?



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2.

Cannot fade... won't stain

Lumite's fresh, bright colors can *never* fade or run. Because it is woven of Dow's Saran, the color is IN the plastic filament itself. *Nothing* can stain it... neither dirt, dust, mud, ink, grease, chewing gum, food, lipstick nor any liquids.

3.

Easy to clean... at less cost

No scrubbing... no vacuuming... no complicated cleaning methods! Easy to clean! That means less time and less labor required to maintain seats... which reduces your annual cost of upkeep considerably.

4.

Pliable... fits snugly... ventilated

Lumite fabric "upholsters well"! It cannot ravel, sag or tear. There is no "cupping." It holds a snug fit on the seat... *permanently!* Because Lumite "breathes", it never becomes sticky in hot weather nor clammy in cold weather.

WRITE TO OUR DEPT. 8B — for free samples and descriptive literature. Our trained engineers will be glad to work with you on your special applications.

LUMITE

woven plastic fabrics

LUMITE DIVISION
CHICOPEE MANUFACTURING CORPORATION
47 WORTH STREET, NEW YORK 13, N. Y.

Freight Operating Statistics of Large Steam Railways—Selected

Region, road and year		Miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (*thousands*)	Car-miles: Per cent loaded	Ton-miles (*thousands*): Gross excl. locos. & tenders	Ton-miles (*thousands*): Net-rev. and non-rev.	Road locos. on line: Serviceable: Unstored	Road locos. on line: Serviceable: Stored	Road locos. on line: B. O.	Road locos. on line: Per cent B. O.
New England Region:													
Boston & Albany	1947	362	153,503	164,291	19,151	3,605	64.4	231,167	96,080	60	2	28	31.1
	1946	362	131,827	143,225	16,267	3,165	66.7	188,772	74,246	55	5	25	29.4
Boston & Maine	1947	1,750	324,449	331,859	11,238	11,907	73.9	714,947	315,994	107	16	13	9.6
	1946	1,752	272,811	282,697	9,332	10,792	73.5	626,901	268,011	101	23	14	10.1
N. Y., New H. & Hartf*	1947	1,815	381,327	526,545	41,693	14,523	70.9	854,205	371,975	199	3	41	19.7
	1946	1,820	354,748	505,752	41,778	14,321	72.8	801,281	338,745	204	21	56	23.4
Great Lakes Region:													
Delaware & Hudson	1947	794	294,103	353,812	33,153	12,785	69.7	911,113	494,963	123	40	30	15.5
	1946	846	216,643	254,931	27,177	9,406	71.1	611,247	310,352	116	89	21	9.3
Del., Lack. & Western	1947	970	335,552	380,398	45,925	14,579	68.7	971,576	444,545	114	8	17	12.2
	1946	971	258,262	296,487	37,256	12,077	70.8	755,822	338,368	104	40	26	15.3
Erie	1947	2,229	790,471	840,931	61,610	38,287	65.6	2,540,453	1,074,468	281	16	87	22.7
	1946	2,242	604,781	638,554	49,580	31,484	69.1	1,946,613	813,934	263	72	57	14.5
Grand Trunk Western	1947	972	298,443	305,262	2,502	10,126	67.2	652,138	282,902	66	...	6	8.3
	1946	972	226,190	230,487	1,769	8,048	69.3	479,867	191,462	66	4	8	10.3
Lehigh Valley	1947	1,239	343,190	380,542	61,463	14,932	66.9	1,035,954	502,957	118	13	38	22.5
	1946	1,242	256,580	284,962	41,532	12,584	71.1	822,688	404,739	108	25	36	21.3
New York Central	1947	10,338	3,407,066	3,657,338	248,043	126,001	63.4	8,704,427	4,027,763	1,057	17	326	23.3
	1946	10,328	2,253,174	2,399,716	151,045	97,543	66.7	6,095,059	2,631,778	903	189	351	24.3
New York, Chi. & St. L.	1947	1,656	690,223	695,053	9,080	27,398	66.5	1,766,656	755,070	138	5	20	12.3
	1946	1,656	462,658	470,578	6,430	21,854	71.1	1,315,452	559,667	128	34	26	13.8
Pere Marquette	1947	1,913	427,543	435,571	9,372	13,906	66.6	902,707	393,229	127	7	24	15.2
	1946	1,915	287,669	297,011	6,656	10,773	71.4	671,205	296,970	124	18	25	15.0
Pitts. & Lake Erie	1947	223	109,821	113,237	157	4,631	65.0	394,260	232,608	34	...	13	27.7
	1946	229	60,444	60,459	105	2,343	66.0	193,731	113,069	22	8	20	40.0
Wabash	1947	2,381	680,056	694,976	15,520	24,414	71.4	1,538,473	669,100	164	2	39	19.0
	1946	2,381	569,896	588,161	13,652	20,577	71.8	1,259,063	525,829	155	19	36	17.1
Central Eastern Region:													
Baltimore & Ohio	1947	6,103	2,180,456	2,756,246	318,320	76,017	63.4	5,635,251	2,818,017	841	2	302	26.4
	1946	6,103	1,617,074	1,980,635	206,302	57,862	67.0	3,891,087	1,834,792	798	62	304	26.1
Central of New Jersey*	1947	419	87,575	98,596	17,963	3,287	66.6	238,931	125,582	48	...	28	36.8
	1946	649	142,893	166,420	46,571	5,594	68.6	395,035	207,910	101	3	50	32.5
Central of Pennsylvania	1947	213	86,296	100,894	21,482	3,467	70.3	230,360	120,303	45	...	17	27.4
	1946	...	...	...	...	...	...	...	...	...	...	...	...
Chicago & Eastern Ill.	1947	910	189,184	190,200	3,535	5,822	70.2	384,549	189,982	57	1	15	20.5
	1946	910	120,411	121,473	2,443	4,112	73.6	252,779	116,469	50	9	20	25.3
Elgin, Joliet & Eastern	1947	391	124,657	129,732	4,104	3,923	68.0	297,370	161,641	43	7	13	20.6
	1946	392	85,625	90,614	2,570	2,644	69.0	193,444	103,219	40	10	19	27.5
Long Island	1947	372	32,731	34,432	16,317	381	56.1	27,389	12,167	34	1	5	12.5
	1946	372	27,464	29,544	14,275	365	56.7	25,694	10,974	31	...	3	8.8
Pennsylvania System	1947	10,031	4,223,894	4,794,535	660,428	165,494	65.6	11,744,224	5,834,840	1,942	4	303	13.5
	1946	10,033	2,965,532	3,425,412	456,666	125,043	68.1	7,920,719	3,567,863	1,707	242	307	13.6
Reading	1947	1,357	486,646	544,108	66,292	17,453	65.5	1,332,929	727,222	226	25	45	15.2
	1946	1,361	439,554	486,509	55,019	14,101	67.6	1,044,172	568,730	249	16	62	19.0
Pocahontas Region:													
Chesapeake & Ohio	1947	3,067	1,408,121	1,517,023	78,152	69,238	56.9	6,080,911	3,562,823	492	1	60	10.8
	1946	3,045	718,366	774,273	36,046	33,176	63.5	2,543,019	1,461,889	441	33	65	12.1
Norfolk & Western	1947	2,108	871,247	932,194	68,664	41,694	58.0	3,713,950	2,066,552	272	29	13	4.1
	1946	2,139	500,414	530,549	36,099	21,455	64.1	1,686,449	897,422	240	84	18	5.3
Southern Region:													
Atlantic Coast Line	1947	5,556	1,136,766	1,148,903	16,553	27,878	62.6	1,882,957	821,546	371	25	62	13.5
	1946	5,552	1,023,886	1,049,047	7,688	28,076	67.9	1,749,113	764,587	401	16	23	5.2
Central of Georgia*	1947	1,782	304,520	309,047	5,094	7,607	72.7	501,384	237,249	88	1	11	11.0
	1946	1,783	280,087	286,433	5,402	7,154	73.1	444,812	204,197	94	...	8	7.8
Gulf, Mobile & Ohio	1947	1,931	284,942	299,907	1,626	12,532	71.2	811,350	386,788	105	7	17	13.2
	1946	1,931	266,354	324,976	3,287	9,469	74.1	590,808	274,905	101	10	15	11.9
Illinois Central	1947	6,582	1,573,139	1,591,915	57,040	58,087	64.6	3,989,389	1,863,201	572	19	80	11.9
	1946	6,601	1,223,281	1,235,104	41,923	47,230	66.8	3,014,261	1,340,507	575	25	104	14.8
Louisville & Nashville	1947	4,759	1,661,731	1,794,158	48,493	42,660	63.1	3,116,337	1,563,068	404	1	70	14.7
	1946	4,750	1,116,131	1,206,988	30,586	30,030	67.7	1,945,657	901,262	388	50	59	11.9
Seaboard Air Line	1947	4,145	921,076	979,100	11,723	26,372	66.2	1,771,473	765,003	298	1	53	15.1
	1946	4,139	889,507	945,006	12,422	25,795	68.3	1,658,431	690,689	276	...	62	18.3
Southern	1947	6,451	1,860,839	1,890,344	31,821	47,852	70.0	3,040,275	1,382,685	583	14	105	15.0
	1946	6,450	1,713,820	1,745,791	30,012	43,508	71.4	2,567,133	1,119,544	593	5	132	18.1
Northwestern Region:													
Chi. & North Western	1947	8,061	1,051,901	1,086,441	28,385	34,871	68.9	2,330,576	1,046,130	346	1	130	27.3
	1946	8,062	868,893	903,155	19,042	27,828	66.7	1,813,266	793,098	362	24	126	24.6
Chicago Great Western	1947	1,445	265,655	267,874	10,731	8,749	69.7	563,005	249,240	68	...	13	16.0
	1946	1,445	224,335	227,860	11,071	7,119	71.0	452,473	197,893	65	...	14	17.7
Chi., Milw., St. P. & Pac.	1947	10,725	1,494,078	1,578,975	60,734	49,479	66.5	3,336,873	1,536,958	481	30	94	15.5
	1946	10,725	1,192,349	1,258,628	49,161	40,179	66.9	2,639,080	1,183,459	438	96	71	11.7
Chi., St. P., Minneap. & Om.	1947	1,606	203,218	215,195	12,141	5,362	71.7	348,598	155,170	74	...	32	30.2
	1946	1,606	175,924	187,408	10,638	4,665	71.1	301,825	135,868	82	1	41	33.1
Duluth, Missabe & Iron Range	1947	547	153,763	154,162	611	8,554	51.5	770,424	465,819	45	...	...	
	1946	546	88,358	88,665	459	4,680	50.8	434,961	264,692	44	...	4	8.3
Great Northern	1947	8,237	1,044,068	1,048,499	40,770	40,871	65.5	2,981,716	1,484,012	323	61	72	15.8
	1946	8,236	980,809	981,050	48,938	36,325	64.7	2,606,022	1,252,089	344	73	79	15.9
Minneap., St. P. & S. St. M.	1947	4,181	443,503	453,051	8,211	12,796	68.2	837,705	394,581	123	...	14	10.2
	1946	4,181	429,581	441,976	8,915	12,058	65.2	811,745	375,246	130	...	13	9.1
Northern Pacific	1947	6,623	791,605	832,321	47,289	31,903	68.0	2,194,485	1,066,925	342	47	49	11.2
	1946	6,576	752,854	791,475	49,188	27,889	70.1	1,921,849	929,964	319	57	63	14.4
Central Western Region:													
Alton*	1947	915	156,566	156,576	589	5,252	69.9	382,875	178,971	64	1		
	1946	915	163,349	165,510	575	4,853	69.2	311,637	151,375	58	22	16	16.7
Atch., Top. & S. F. (Incl. G. C. & S. F. & P. & S. F.)	1947	13,107	2,875,648	3,049,297	181,077	107,584	66.4	7,096,279	2,739,923	731	124	118	12.1
	1946	13,085	2,644,802	2,804,936	166,329	95,394	65.8	6,286,973	2,393,977	749	80	152	15.5
Chi. Burl. & Quincy	1947	8,671	1,303,039	1,335,710	48,481	50,370	66.3	3,478,439	1,623,137	409	23	80	15.6
	1946	8,666	1,024,854	1,066,233	37,693	40,033	68.3	2,609,863	1,191,972	396	80	72	13.1
Chi. Rock I. & Pac.*	1947	7,619	1,346,362	1,382,898	22,264	39,509	58.6	2,796,066	1,154,757	312	3	88	21.8
	1946	7,615	1,032,706	1,062,000	17,553	33,099	65.9	2,147,735	920,040	326	35	99	21.5
Denver & R. G. Wn.	1947	2,467	381,072	422,640	48,802	12,038	75.4	794,911	396,699	142	64	34	14.2
	1946	2,491	300,697	329,506	37,542	8,827	76.5	546,925	262,824	132	50	46	20.2
Southern Pacific Company	1947	8,159	2,323,988	2,617,318	469,887	92,226	64.9	6,295,171	2,470,278	790	3	191	19.4
	1946	8,172	2,126,460	2,390,018	395,386	82,292	66.2	5,438,430	2,140,059	788	3	170	17.7
Union Pacific	1947	9,775	2,471,512	2,613,653	212,923	96,260	67.0	6,364,531	2,744,338	645	83	96	11.7
	1946	9,775	1,968,137	2,063,557	160,358	75,726	68.3	4,807,982	1,972,086	571	188	135	15.1
Southwestern Region:													
Mo.-Kans.-Texas Lines	1947	3,241	541,736	552,830	9,436	16,012	64.1	1,050,228	450,746	120	...	40	25.0
	1946	3,241	490,825	505,022	9,129	13,644	67.0	864,204	373,660	110	...	54	32.9
Missouri Pacific*	1947	7,011	1,564,054	1,619,854	33,693	51,820	64.0	3,555,592	1,551,726	437	2	50	10.2
	1946	7,053	1,254,938	1,317,491	31,492	43,684	65.6	2,849,304	1,198,272	428	...	85	16.6
Texas & Pacific	1947	1,871	454,400	454,400	7,655	14,697	59.8	1,047,795	424,254	108	23	15	10.3
	1946	1,871	361,645	361,645	8,921	11,730	67.3	768,617	318,639	115	35	9	5.7
St. Louis-San Francisco	1947	4,615	987,808	1,013,986	11,355	24,131	64.4	1,672,683	744,818	274	22	31	9.5
	1946	4,615	808,278	833,715	9,791	20,277	65.8	1,316,493	568,907	303	9	29	8.5
St. Louis-San Fran. & Texas	1947	156	30,027	30,634	52	623	63.6	44,148	18,256	8	2	2	16.7
	1946	156	29,996	32,148	26	562	62.7	39,295	16,539	8	...	1	11.1
St. Louis Southw. Lines*	1947	1,568	372,780	375,860	4,909	14,733	73.7	887,576	396,759	86	12	13	11.7
	1946	1,568	326,404	329,542	4,570	13,206	73.6	755,779	337,844	83	34	20	14.6
Texas & New Orleans	1947	4,318	972,165	973,457	10,887	26,997	70.1	1,758,790	770,003	226	...	29	11.4
	1946	4,321	897,237	899,183	17,252	24,901	70.4	1,554,351	651,329	238	...	28	10.5

* Report of trustee or trustees.

Items for the Month of May 1947 Compared with May 1946

Region, road and year	Freight cars on line: Home	Foreign	Total	Per Cent B. O.	G.t.m. per train-hr. excl.locos. and tenders	G.t.m. per train-mi. excl.locos. and tenders	Net ton-mi. per train-mile	Net ton-mi. per l'd. car-mile	Net ton-mi. per car-day	Car miles per car-day	Net daily ton-mi. per road-mi.	Coal lb. per 1000 g.t.m. inc. loco.	Mi. per loco. per day
New England Region:													
Boston & Albany 1947	268	5,266	5,534	0.4	24,579	1,517	631	26.7	566	33.0	8,562	166	74.2
1946	356	5,435	5,791	0.3	22,232	1,444	568	23.5	411	26.3	6,616	196	66.5
Boston & Maine 1947	1,196	10,750	11,946	1.8	34,590	2,208	976	26.5	858	43.8	5,825	107	87.9
1946	2,096	10,050	12,146	2.0	33,978	2,304	985	24.8	684	37.5	4,935	104	73.7
N. Y., New H. & Hartf* 1947	1,349	18,375	19,724	2.1	32,305	2,246	978	25.6	583	32.1	6,611	93	78.6
1946	2,583	16,712	19,295	4.4	30,782	2,265	957	23.7	558	32.4	6,004	90	69.3
Great Lakes Region:													
Delaware & Hudson 1947	1,910	7,398	9,308	3.5	55,539	3,115	1,692	38.7	1,722	63.8	20,109	102	67.8
1946	3,858	4,783	8,641	4.8	48,133	2,836	1,440	33.0	1,140	48.6	11,834	107	42.9
Del., Lack. & Western 1947	4,412	13,639	18,051	3.5	44,623	2,927	1,339	30.5	769	36.8	14,784	107	95.7
1946	6,178	13,321	19,499	4.8	42,281	2,985	1,336	28.0	607	30.6	11,241	111	70.8
Erie 1947	4,968	25,045	30,013	3.2	52,745	3,239	1,370	28.1	1,136	61.7	15,550	96	82.8
1946	10,365	24,376	34,741	3.2	51,476	3,246	1,357	25.9	813	45.5	11,712	100	62.7
Grand Trunk Western 1947	3,445	9,108	12,553	6.2	44,502	2,201	955	27.9	681	36.3	9,389	86	145.1
1946	4,226	9,287	13,513	8.0	42,754	2,130	850	23.8	484	29.3	6,354	87	105.5
Lehigh Valley 1947	4,808	14,072	18,880	4.2	54,757	3,103	1,507	33.7	842	37.4	13,095	102	88.1
1946	6,607	10,421	17,028	8.9	52,401	3,290	1,619	32.2	731	32.0	10,512	98	66.1
New York Central 1947	43,339	102,171	145,519	3.7	41,247	2,585	1,196	32.0	883	43.6	12,568	105	99.8
1946	61,255	94,353	155,608	4.9	41,761	2,747	1,186	27.0	569	31.6	8,220	104	64.9
New York, Chi. & St. L. 1947	2,041	14,371	16,412	2.2	50,023	2,573	1,100	27.6	1,436	78.4	14,708	86	148.7
1946	3,303	11,949	15,252	3.6	52,421	2,861	1,217	25.6	1,238	68.0	10,902	78	87.7
Pere Marquette 1947	4,058	12,773	16,831	3.0	36,973	2,123	925	28.3	720	38.2	6,631	97	97.0
1946	5,214	9,985	15,199	5.0	38,471	2,351	1,040	27.6	655	33.3	5,002	89	64.3
Pitts. & Lake Erie 1947	2,580	11,356	13,936	4.3	54,987	3,606	2,128	50.2	527	16.2	33,648	93	84.6
1946	7,160	9,030	16,190	5.5	47,788	3,219	1,879	48.3	246	7.7	15,927	96	43.0
Wabash 1947	4,997	14,182	19,179	3.5	45,384	2,285	994	27.4	1,096	56.0	9,065	108	116.7
1946	6,922	12,789	19,711	3.5	44,716	2,234	933	25.6	858	46.8	7,124	110	96.4
Central Eastern Region:													
Baltimore & Ohio 1947	37,384	51,082	88,466	4.9	33,159	2,641	1,321	37.1	1,025	43.7	14,895	147	89.5
1946	42,021	46,982	89,003	6.3	32,158	2,467	1,163	31.7	645	30.4	9,698	141	62.5
Central of New Jersey* 1947	506	9,843	10,349	2.6	35,534	2,805	1,474	38.2	396	15.5	9,668	129	71.9
1946	5,480	10,287	15,767	8.5	30,245	2,887	1,519	37.2	413	16.2	10,334	111	58.8
Central of Pennsylvania 1947	908	3,725	4,633	6.2	37,932	2,752	1,437	34.7	813	33.3	18,219	140	74.2
1946	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago & Eastern Ill. 1947	1,576	4,316	5,892	5.9	37,076	2,067	1,021	32.6	1,038	45.3	6,735	112	88.8
1946	3,240	3,907	7,147	5.9	33,999	2,128	980	28.3	543	26.0	4,129	118	53.4
Elgin, Joliet & Eastern 1947	6,153	10,419	16,572	2.0	19,473	2,531	1,376	41.2	314	11.2	13,336	126	100.4
1946	7,749	8,469	16,218	3.3	19,963	2,434	1,299	39.0	230	8.5	8,494	150	59.7
Long Island 1947	47	4,497	4,544	.6	6,585	855	380	31.9	76	4.2	1,055	339	58.0
1946	51	4,392	4,443	.5	7,169	957	409	30.1	72	4.2	952	361	53.3
Pennsylvania System 1947	110,680	132,352	243,032	10.1	38,693	2,875	1,428	35.3	769	33.2	18,764	125	84.6
1946	141,185	106,055	247,240	7.8	39,447	2,746	1,237	28.5	466	24.0	11,471	126	60.2
Reading 1947	7,662	25,844	33,506	2.5	36,734	2,744	1,497	41.7	680	24.9	17,287	104	76.3
1946	15,467	18,165	33,632	2.6	28,331	2,384	1,299	40.3	501	18.4	13,480	118	63.1
Pocahontas Region:													
Chesapeake & Ohio 1947	41,956	21,903	63,859	1.0	64,649	4,400	2,578	51.5	1,861	63.6	37,473	71	101.7
1946	43,402	19,891	63,293	2.1	54,273	3,615	2,078	44.1	718	25.7	15,487	77	52.5
Norfolk & Western 1947	28,803	7,611	36,414	2.0	68,681	4,337	2,413	49.6	1,866	64.9	31,624	86	109.9
1946	31,715	6,284	37,999	2.5	54,442	3,440	1,831	41.8	670	25.0	13,534	98	58.0
Southern Region:													
Atlantic Coast Line 1947	7,846	20,610	28,456	3.5	27,747	1,665	726	29.5	930	50.5	4,770	118	88.2
1946	9,476	22,707	32,183	2.3	27,095	1,734	758	27.2	754	40.8	4,442	116	82.2
Central of Georgia* 1947	1,480	6,567	8,047	2.4	30,692	1,650	781	31.2	966	42.6	4,295	129	104.0
1946	2,056	6,227	8,283	1.8	29,619	1,591	730	28.5	807	38.7	3,694	134	99.0
Gulf, Mobile & Ohio 1947	1,565	8,624	10,189	1.1	53,158	2,855	1,361	30.9	1,260	57.3	6,461	61	79.7
1946	2,071	6,055	8,126	2.0	38,964	2,229	1,036	29.0	1,040	48.4	4,586	109	89.8
Illinois Central 1947	15,100	35,083	50,183	1.3	44,467	2,596	1,212	32.1	1,214	58.6	9,131	119	83.7
1946	15,557	36,165	51,722	1.5	41,631	2,534	1,127	28.4	823	43.4	6,551	121	61.9
Louisville & Nashville 1947	23,062	18,539	41,601	4.3	29,200	1,876	941	36.6	1,231	53.3	10,595	125	130.7
1946	33,743	17,082	50,825	3.5	27,465	1,743	807	30.0	542	26.7	6,121	124	84.5
Seaboard Air Line 1947	5,587	17,408	22,995	1.7	34,399	1,968	850	29.0	1,083	56.5	5,954	114	102.6
1946	6,509	18,991	25,500	2.2	33,261	1,927	803	26.8	850	46.5	5,383	121	100.0
Southern 1947	12,664	34,154	46,818	4.4	28,440	1,652	751	28.9	966	47.7	6,914	127	95.1
1946	15,896	33,962	49,858	4.9	25,887	1,516	661	25.7	732	39.9	5,599	143	82.2
Northwestern Region:													
Chi. & North Western 1947	18,518	32,788	51,306	3.9	32,942	2,316	1,040	30.0	636	30.8	4,186	126	81.9
1946	21,729	30,427	52,156	4.0	33,400	2,150	940	28.5	496	26.1	3,173	124	63.4
Chicago Great Western 1947	929	4,643	5,572	2.4	35,548	2,120	938	28.5	1,414	71.2	5,564	124	117.5
1946	1,283	4,511	5,794	4.8	34,635	2,024	885	27.8	1,110	56.3	4,418	126	101.0
Chi., Milw., St. P. & Pac. 1947	19,688	37,993	57,681	1.8	35,280	2,254	1,038	31.1	848	41.0	4,623	115	94.8
1946	24,512	31,676	56,188	1.7	36,027	2,236	1,003	29.5	694	35.2	3,560	120	75.1
Chi., St. P., Minneap. & Om. 1947	891	6,557	7,448	7.6	23,092	1,749	778	28.9	666	32.1	3,117	112	72.8
1946	1,086	6,959	8,045	8.2	23,030	1,740	783	29.1	536	25.8	2,729	122	57.1
Duluth, Missabe & Iron Range 1947	14,580	380	14,960	1.7	91,002	5,192	3,139	54.5	998	35.6	27,471	58	127.4
1946	14,750	280	15,030	3.4	87,465	5,062	3,081	56.6	562	19.5	15,638	61	65.1
Great Northern 1947	19,950	27,727	47,677	2.9	45,977	2,871	1,429	36.3	1,010	42.4	5,812	91	82.3
1946	22,836	21,395	44,231	4.4	42,007	2,686	1,290	34.5	903	40.5	4,904	97	72.5
Minneap., St. P. & S. St. M. 1947	5,721	8,436	14,157	7.7	32,722	1,909	899	30.8	893	42.5	3,044	92	114.6
1946	6,450	9,043	15,493	4.4	33,214	1,916	886	31.1	862	42.5	2,895	94	107.5
Northern Pacific 1947	16,389	19,796	36,185	4.9	46,748	2,786	1,354	33.4	961	42.3	5,197	129	71.0
1946	17,458	15,895	33,353	4.9	41,268	2,580	1,248	33.3	861	36.8	4,562	133	67.1
Central Western Region:													
Alton* 1947	819	5,421	6,240	1.8	45,651	2,451	1,146	34.1	938	39.4	6,310	129	83.8
1946	1,682	5,312	6,994	1.1	30,694	1,921	933	31.2	686	31.8	5,337	103	61.5
Atch., Top. & S. F. (Incl. 1947	39,722	43,112	82,834	5.2	49,859	2,481	958	25.5	1,112	65.8	6,743	100	113.7
G. C. & S. F. & P. & S. F.) 1946	41,683	39,392	81,075	4.5	47,381	2,392	911	25.1	973	59.0	5,902	104	102.2
Chi. Burl. & Quincy 1947	12,667	32,375	45,042	2.9	45,636	2,678	1,250	32.2	1,192	55.8	6,038	100	92.3
1946	18,491	23,303	41,794	3.2	43,001	2,561	1,170	29.8	929	45.7	4,437	105	69.3
Chi. Rock I. & Pac.* 1947	9,487	29,097	38,584	3.0	37,721	2,086	861	29.2	1,041	60.8	4,889	104	118.1
1946	12,485	23,812	36,297	4.4	38,276	2,091	896	27.8	849	46.4	3,897	97	80.1
Denver & R. G. Wn. 1947	7,093	5,052	12,145	4.9	37,021	2,102	1,049	33.0	1,059	42.6	5,187	158	66.3
1946	8,159	3,876	12,035	5.1	32,574	1,831	880	29.8	679	29.8	3,404	166	54.7
Southern Pacific Company 1947	21,333	45,467	66,800	2.8	42,942	2,734	1,073	26.8	1,172	67.5	9,767	99	107.6
1946	22,920	48,685	71,605	3.3	39,851	2,585	1,017	26.0	979	56.8	8,448	101	101.1
Union Pacific 1947	24,751	28,937	53,688	3.1	52,856	2,600	1,121	28.5	1,566	82.0	9,056	125	110.7
1946	27,457	28,609	56,066	4.5	50,899	2,475	1,015	26.0	1,120	62.9	6,508	127	81.8
Southwestern Region:													
Mo.-Kans.-Texas Lines 1947	1,339	9,602	10,941	.5	36,642	1,945	835	28.2	1,428	79.2	4,486	80	118.9
1946	1,753	9,653	11,406	.8	34,549	1,775	768	27.4	1,114	60.7	3,719	81	106.5
Missouri Pacific* 1947	15,911	27,453	43,364	2.0	42,492	2,287	998	29.9	1,194	62.3	7,140	104	117.6
1946	15,930	26,327	42,257	1.4	41,083	2,280	959	27.4	944	52.5	5,480	105	91.3
Texas & Pacific 1947	1,212	8,112	9,324	3.1	45,028	2,331	944	28.9	1,619	93.8	7,315	86	110.1
1946	1,481	6,041	7,522	1.9	42,369	2,149	891	27.2	1,234	67.5	5,494	94	79.6
St. Louis-San Francisco 1947	4,695	16,386	21,081	2.0	33,673	1,699	756	30.9	1,162	58.4	5,206	122	106.9
1946	6,771	13,388	20,159	1.7	31,971	1,636	707	28.1	941	51.0	3,977	125	83.8
St. Louis-San Fran. & Texas 1947	.....	466	466	1.1	27,421	1,472	609	29.3	1,279	68.6	3,775	118	77.4
1946	.....	471	471	1.1	24,559	1,312	552	29.4	1,215	65.8	3,420	116	105.3
St. Louis Southw. Lines* 1947	1,222	5,360	6,582	3.2	47,264	2,383	1,065	26.9	2,062	103.8	8,162	77	117.6
1946	1,251	6,145	7,396	1.5	44,819	2,320	1,037	25.6	1,550	82.3	6,950	79	82.6
Texas & New Orleans 1947	3,098	15,928	19,026	2.5	36,089	1,830	801	28.5	1,275	63.8	5,752	84	131.4
1946	3,865	17,386	21,251	3.6	33,138	1,756	733	26.2	970	52.6	4,862	90	117.9

Compiled by the Bureau of Transport Economics and Statistics, Interstate Commerce Commission. Subject to revision.

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Facts You Should Know About Our Business System . . . and You, prepared by the Educational Division of the Association of Better Business Bureaus. 15 pages. Published by the Association of Better Business Bureaus, Inc., 405 Lexington ave., New York 17. Price, 5 cents a copy from the nearest Better Business Bureau; available for distribution by business concerns at $32 per thousand, f. o. b. Boston, Mass.

This is one of a series of booklets published in the interest of consumer education and to help consumers in their relations with business. It describes briefly and clearly the American system of free enterprise and how it works. It is designed to help clear up some of the confusion in the public mind regarding business, profits, individual liberty, and the rewards for incentive and business risk, and it makes a comparison of communism and other economic systems.

You and Your Railroads; What They Do, What They Get, What They Spend, prepared by the Association of American Railroads. 23 pages. Published by the Association of American Railroads, Transportation Building, Washington 6, D. C. Free.

This pamphlet is a handy reference source for useful economic facts about the railroads, including some comparisons between today's situation and that of earlier years. It tells how much freight, passenger and mail traffic the railroads haul, and how much they are paid for hauling it; how wage rates and charges for fuel, material and supplies have risen, and in comparison, how much rates have increased; how much the railroads pay in taxes and how the money is used; how much is invested in the railroads, and by whom, and suggests what a proper rate of return should be (not less than 6 per cent) to enable the railroads to secure from private investors the funds necessary to continue improving their properties.

Motor Truck Facts, 1947 Edition. 56 pages. Published by the Motor Truck Committee, Automobile Manufacturers Association, New Center Building, Detroit, Mich. Free.

This is the first issue of Motor Truck Facts to be issued since the war. It contains useful statistics relating to the motor truck industry for 1946 and preceding years. Statistical series include motor truck production, registrations, taxes, employment, use of trucks by areas and commodities, age of trucks and highway standards.

William Galt Raymond, by B. J. Lambert. 52 pages. Published by the University of Iowa Press, Iowa City, Ia. Price, $1.

This pamphlet is one of a series of memoirs being issued by the State University of Iowa in connection with its centennial year. While this memoir deals largely with the work of Mr. Raymond at the University, where he served as dean of the College of Applied Science, he was known in railroad circles as the author of several books on railroad engineering and was a member of the American Railway Engineering Association, serving on the Committee on Economics of Railway Operation. He was also a member and president of the Society for the Promotion of Engineering Education.

Highway Statistics, 1945, prepared by the Public Roads Administration, Federal Works Agency. 75 pages. Available from the United States Government Printing Office, Washington 25, D. C. Price, 35 cents.

This pamphlet presents the 1945 series of statistical and analytical tables of general interest on the subjects of motor fuel consumption, motor vehicle registration, state highway-user taxes, financing of state highways and highway mileage. The Public Roads Administration has prepared these tables and distributed them individually for the number of years. This practice will be continued so that information on each subject can be made available at the earliest possible date. However, issuance of these tables in assembled, permanent form will make the data more convenient and serviceable to users of highway statistics.

BOOKS

Railroad Wages and Labor Relations 1900-1946; An Historical Survey and Summary of Results, compiled and edited under the supervision of Harry E. Jones. 351 pages. Published by the Bureau of Information of the Eastern Railways, Grand Central Terminal, New York 17.

This volume brings up to date the study originally published in 1942 under the title "Wages and Labor Relations in the Railroad Industry 1900-1941." It presents a survey of the activities of the railroad labor unions during the last 45 years. The study is divided into two parts—the first being a historical survey and the second, a summary of results for the employees, the industry and the bondholders and stockholders. Methods of payment to train and engine service employees are explained, and there are a great number of tables, showing for a number of years the hourly, weekly, monthly and yearly wages for the various classes of employees.

Le Centenaire des Chemins de Fer Suisses. 159 pages, illustrations. Published by the Office of the Director General of the Swiss Federal Railways, Librairie Payot, Lausanne, Switzerland.

This book, which is in French, was published to celebrate the centennial of the Swiss railways. There are chapters on the Swiss people and their railroads; the development of the railroads during the past century; administration and operation of the railroads, financing of the railroads, the first railroad, and the railroads during two world wars. The book is very well illustrated, several color plates being included.